THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XIX. No. 472—22ND YEAR.] LONDON, NOVEMBER 8, 1870. [Subscription per Annum. { 15s. in Advance. / 18s. Credit.] Price 8d. Unstamped.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis—
10,000 cubic feet of gas per ton of coal.
26-candle gas.
13¼ cwt. coke per ton of coal.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828.
FIRE-BRICK WORKS, established 1804.
FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay.
The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article.
The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GEORGE GLOVER & CO.,
Patentees of the Standard Gasometers for the Government, and of the
IMPROVED DRY GAS-METERS.

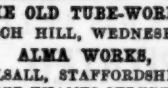
These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.

To meet the increasing demand, G. GLOVER AND CO. have just entered on possession of extensive premises adjoining their present Works in Ranelagh Road, and they are now prepared to execute promptly, orders to any extent. They keep in stock all sizes of Meters up to 200 lights. In cases of haste, on the receipt of a telegram early on one day, their Meters can be delivered next day in any part of England, and in the large towns in Scotland.

Particulars and lists of prices forwarded on application to—
RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW;
OR
15, MARKET STREET, MANCHESTER.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.



JOHN RUSSELL and CO.,
THE OLD TUBE-WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,
Original Manufacturers of Wrought-Iron Gas-Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam-Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest orders may be executed in a few days.
Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanized Tubes, &c.
N.B.—All goods thoroughly tested before sent out, and warranted.

JOHN BENT & SON,
WET AND DRY GAS-METER
AND
STREET-LAMP
MANUFACTURERS,
BELL BARN ROAD, BIRMINGHAM.
ESTABLISHED 1830.
All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS,
NEAR NEWCASTLE-ON-TYNE.
WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
London Agents: JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

CANNEL COAL FACTORS.
J. & W. ROMANS, of Edinburgh and London, in returning thanks for the confidence hitherto reposed in them, beg to intimate that they have exended their Colliery connexion for the supply of SCOTTISH CANNELS, and have taken a lease of the CROWN WHARF, LIMEHOUSE CUT, LONDON, where these rich Coals can be obtained at the lowest prices.
Messrs. ROMANS, being lessees of several Gas-Works in Scotland, have their Cannels tested in the ordinary working-process-way of gas-making, thus securing for their customers additional guarantee, beyond mere laboratory experiments.
Contracts made to supply any quantity, and analysis sent, on application to the Offices, 53, Frederick Street, EDINBURGH, or 1, Walbrook, Mansion House, LONDON.
Shippers of steam and house Coal, entered on the Government list. Freightage secured on best terms.

LESMAHAGO GAS COAL,
AUCHINHEATH COLLIERY,
LESMAHAGO N.B.

JAMES FERGUSON & CO.
LESSEES SINCE 1832.
LONDON AGENTS:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, E.C.
CONTINENTAL AGENTS:
LA COUR & WATSON,
LEITH.

GEORGE GLOVER AND CO.,

Patentees of the Standard Gasometers for the Government,

TWO MEDALS,

LONDON, 1862.

HAVE OBTAINED THE

HIGHEST

PRIZE

FOR

SILVER MEDAL,

PARIS, 1867.

IMPROVED DRY GAS-METERS AND GASOMETERS,

AT THE

PARIS EXHIBITION.

RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
AND 127, BOULEVARD DE MAGENTA, PARIS.

HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS,

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

London Agent—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

For Gas, Steam, Water, &c.

SOLE LICENSEES for the United Kingdom for the LAVENANT PATENT ENAMELLED TUBES & FITTINGS,

the Coating of which does not shell off, is a certain preservative from rust, and resists all effects of expansion and contraction.

LAP-WELDED IRON & HOMOGENEOUS METAL TUBES

For Locomotive, Marine, and Stationary Boilers.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

WAREHOUSES:

LONDON: No. 157, Upper Thames Street, E.C. LIVERPOOL: No. 63, Paradise Street. MANCHESTER: Barlow's Croft, Chapel Street, Salford. PARIS and LILLE.

ECONOMY IN GAS PURIFICATION. A PURER GAS AT LESS COST, AND GREAT SAVING IN LABOUR.

M'DOUGALLS' PRECIPITATED PEROXIDE OF IRON.

The above Oxide is now in use at some of the largest works in the kingdom, and has gained a decided preference, owing to its efficiency, cheapness, and the great saving in labour effected by its use.

It is a pure artificial Hydrated Peroxide, with an addition of only sufficient sawdust to give it the needful lightness or porosity to prevent pressure, and every particle is available for use.

In selecting an oxide, a point more important than its price, is to learn the cost of labour entailed in its use. Whilst at large works the cost of labour for purifying, where lime alone or the natural oxides are employed, is 2d. to 3d. per ton of coals, by the use of the above Oxide it is reduced to 1d. to 1½d., owing to the purifier's working so much longer when charged, and to rapid revivification—two points of special importance in the busy season.

For export to Foreign Works it is unequalled, every particle being available, and saves freight over less concentrated materials.

NOTE.—It is important to note that only the Hydrated Peroxide of Iron is useful, simple oxide being worthless. Inferior oxides show a large per centage of simple oxide, but very little Hydrated Peroxide.

M'DOUGALL BROTHERS,

LONDON—11, ARTHUR STREET WEST, LONDON BRIDGE, E.C. MANCHESTER—68, PORT STREET.

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

SCHOLL'S
PATENT PLATINUM
GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.

"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.

To be had retail of Gas-Fitters and Ironmongers.

JOHN SCHOLL, Manufactory: 41 & 42, BERWICK STREET;
Retail Depot: 198a, OXFORD STREET, LONDON, W.

Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

*** Further testimonials from Drs. Frankland and Crooke, showing the great practical value of this invention, will be shortly published.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gas-Fittings and Gas Apparatus.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent Ribbed Gas Main. PIPES cost but about 1d. to 2d. per yard (depending on the size) more than Plain Pipes, and ensure PERFECT GAS-TIGHT CONNEXIONS with the Service-Pipes.

Apply to Messrs. BEGGS & SON, 37, Southampton Street, Strand, LONDON.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

Established 1811.

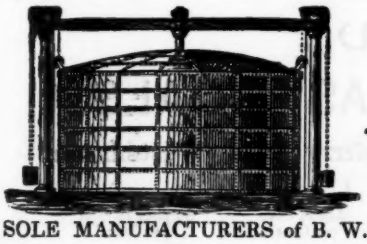
READY & SON,
BILSTON STREET BRASS FOUNDRY
WOLVERHAMPTON
MANUFACTURERS OF
SUN BURNERS, GAS CHANDELIERS,
HALL LANTERNS, BRACKETS, PENDANTS,
And every Description of
GAS-FITTINGS,
Including
MEDIÆVAL FITTINGS FOR CHURCHES, &c

Large Pattern-Books complete, with Book of Prices, 7s. 6d.

D. BRUCE PEEBLES & CO.,
ENGINEERS, WET AND DRY GAS-METER MANUFACTURERS,
BRASSFOUNDERS, & GAS APPARATUS MANUFACTURERS,
FOUNTAINBRIDGE WORKS, EDINBURGH.

SOLE MANUFACTURERS OF
Peebles' Patent Wet and Dry Gas-Meters in Tin-Plate Cases, with Tongue and Groove Joints.
IMPROVED WET METERS IN CAST-IRON CASES.
STATION-METERS, GOVERNORS, EXPERIMENTING METERS, PHOTOMETERS, PRESSURE-GAUGES, &c.

GEORGE NEWTON,
UNION STREET WEST, OLDHAM,
MANUFACTURER OF
IMPROVED WET & DRY CONSUMERS GAS-METERS,
GAS STATION-METERS,
With all the Joints planed,
GOVERNORS, GAUGES, INDICATORS, EXHAUST GOVERNORS, &c.
TERMS, &c., ON APPLICATION.



IMPROVED GAS APPARATUS,
FOR CITIES, TOWNS, VILLAGES, &c.,
INVENTED AND MANUFACTURED BY
W. C. HOLMES & CO.,
WHITESTONE IRON-WORKS, HUDDERSFIELD.

SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

PATENTEES of the IMPROVED COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

Prospectus, Price Lists, &c., on application.

LONDON OFFICES—57, GRACECHURCH STREET, CITY.

*** *Please address letters to Huddersfield.*

REFERENCES TO NEARLY 300 GAS-WORK

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

CAST AND WROUGHT IRON GIRDERS, BRIDGES, AND ROOFS,

STEAM-ENGINE BOILERS, & GENERAL WROUGHT-IRON WORK.

London Agents: PORTER and LANE, 172, FENCHURCH STREET, E.C.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER,

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

And all kinds of Experimental Gas Apparatus.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

Analyses by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

Description.	Cubic Feet of Gas per Ton of Coals.	Illuminating Power in Candles.	Coke per Ton of Coal used. Cwt.	Ash in Coke per Cent.	Sulphur in Coal per Cent.
Best Silkstone . .	10,900	17·0	12·8	2·6	1·7
Norfolk Silkstone . .	11,000	15·94	12·5	4·4	1·64
Silkstone Brights . .	11,500	14·5	12·6	7·4	1·85
Silkstone Nuts . .	10,800	15·85	12·66	6·0	0·69

NOTE.—The illuminating power of the Gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

OFFICES, 34. LONDON WALL, CITY, E.C.

Established 1827.

WILLIAM & BENJAMIN COWAN,

WET & DRY GAS-METER MANUFACTURERS, BRASSFOUNDERS, &c.

STATION-METERS with PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, TEST GASHOLDERS, GAUGES, &c.

BUCCLEUCH STREET WORKS, EDINBURGH.

Sole Manufacturers of ESSON'S PATENT COMPENSATING GAS-METER,

AND OF

COWAN'S PATENT SIDE-VALVE GAS-METER,

All of which may be had with

NEWBIGGING and HINDLE'S "PATENT AIR-TIGHT INDEX-BOX,"

Of which W. & B. C. are the Sole Manufacturers.

W. & B. COWAN'S DRY GAS-METERS, in CAST-IRON CASES,

Possess a simplicity of construction and facility for repair greater than any yet produced, while the excellence of the material and workmanship, and accuracy of registration, cannot be surpassed. The superiority of their Dry Meters in Tin Cases is also well known, having stood the test of years.

PRICE LISTS ON APPLICATION.

GAS AND WATER PIPES.

CLARIDGE, NORTH, & CO.,

BILSTON.

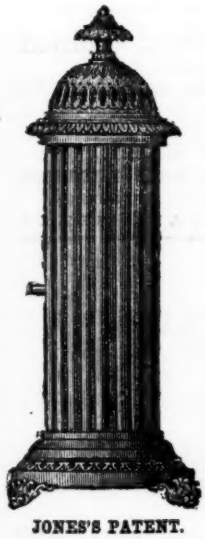
SCOTT AND BUTLER,

MANUFACTURERS OF

GAS-STOVES FOR WARMING, VENTILATING,

AND

DOMESTIC PURPOSES.



JONES'S PATENT.

IMPROVED GAS READING-LAMPS.

TERRA COTTA SMOKE CONSUMER.

OPAL REFLECTORS.

TERRA COTTA BEEHIVE & GRECIAN STOVES.

ARGAND BURNERS.

SINGEING-LAMPS, &c.

SOLE MANUFACTURERS OF

JONES'S PATENT AND REGISTERED

HYGROMETRIC VENTILATING GAS-STOVE,

FOR

GREENHOUSES, BED-ROOMS, &c.

CUMBERLAND WORKS:

91 and 92, CONSTITUTION HILL, BIRMINGHAM.

WANTED, a re-engagement as Working MANAGER of a Gas-Work. Thoroughly understands the making and distributing of gas, main and service laying and meter-fixing, and all duties required in a Gas-Work. Unexceptionable references.
Address L. C., 54, Church Street, Harwich, Essex.

WANTED, by the Advertiser, a situation as GENERAL MANAGER. Is well acquainted with the manufacture and distribution of gas, main and service laying, gas-fitting, &c. Well up in accounts. Good experience at home and abroad. Excellent testimonials and references.
Address S. E., Post-Office, Crowthorne, Sandhurst, Berks.

WANTED, by the Advertiser, a situation as SECRETARY and MANAGER of a Gas-Work, where the annual make is from 30 to 50 million cubic feet.
Address A., care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, by the Advertiser, a situation in a Gas Company. Practical part preferred. Can superintend main and service laying, gas-fitting, &c. Good references. Low salary.
Address H. N. H., care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, a re-engagement as Manager of a Gas-Work. Thoroughly understands the making and distributing of gas, main and service laying, meter-fixing and repairing, and all duties required in a Gas-Work. Unexceptionable references.
Address B. C., 123, Lillington Street, London, S.W.

WANTED, by an experienced Man, age 34, a situation in a Gas-Work, as WORKING MANAGER or FOREMAN, or as Meter Inspector, Repairer, and Fitter, or in any other trustworthy capacity. Ten years in last situation. Good reference.
Address F. M., care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

BRYNMAWR & ABERTILLERY GAS & WATER COMPANY.

WANTED, a thoroughly competent MANAGER. Unexceptionable references indispensable. Salary £7 per month, with house, &c.
Apply to the Secretary, Brynmawr, near Tredegar.

AMMONIACAL LIQUOR WANTED.

A Large continuous Supply is required by a manufacturing firm, for a term of not less than Three years.
Applications to be made, stating quantity and strength by Twaddle's Hydrometer, to F. P. T., Post-Office, Bath.

AMMONIACAL LIQUOR.

THE Directors of the Independent Gas-light and Coke Company are prepared to receive TENDERS for the whole of the AMMONIACAL LIQUOR produced at their works at Haggerston, to commence on the 1st of January, 1871.
All particulars may be obtained on application to Mr. Laing, the Engineer, on the works.
Tenders, stating price and terms of contract, to be sent into me, on or before Friday, the 25th of November, endorsed "Tender for Ammoniacal Liquor."
By order,
James B. Coulson, Secretary.
236, Kingsland Road, Nov. 3, 1870.

GEORGE FLINTOFF, Civil and Gas Engineer, has REMOVED to 5, Great Queen Street, Westminster. Gas and Water Works erected or enlarged; Corporations, Overseers, and others advised on all matters relative to the supply of gas and the rating of gas and water mains.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for 6ix Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
Patents procured for Foreign Countries.
Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, Westminster. [Office of the Journal of Gas Lighting, &c.]

THE IMPERIAL CONTINENTAL GAS ASSOCIATION.
(Incorporated by Act of Parliament.)
NOTICE is hereby given that the HALF-YEARLY ORDINARY MEETING of the Proprietors of the Imperial Continental Gas Association will be held at the City Terminus Hotel, Cannon Street, London, on TUESDAY, the 29th inst., at Two o'clock in the afternoon precisely, when a Report will be made to the Proprietors, a Dividend declared for the half year ended the 30th of June, 1870, and the usual ordinary business of such meeting transacted.
Notice is hereby also given that the Transfer Books of the Association, and the Register of Shareholders, will be closed on Tuesday, the 15th inst., and will remain closed until after the Half-Yearly Ordinary Meeting on the 29th inst.
By order of the Board of Direction,
Alfred F. Jackson, Secretary.
30, Clement's Lane, Lombard Street,
London, Nov. 7, 1870.

EDWD. SANDELL, Public Accountant and Auditor, 4, Skinner's Place, Size Lane, London.
The projector of the *Gas Companies Analyzed Expenditure Account-Book* offers his experience and services in the examination, preparation, and production of all accounts in reference to Gas Companies. References if required.

GAS CONCESSION.

THE Concession and Works for supplying a town of 30,000 inhabitants on the Continent TO BE SOLD. The works have been in operation for six years. Net profits made last year, £1350. Consumption steadily increasing. At present no railway communication, but one in course of construction. Price £15,000.
For further particulars, address K., Messrs. Eyre & Co., 4, Bouverie Street, Fleet Street, E.C.

IMPORTANT TO GAS COMPANIES.

IN anticipation of the "Sales of Gas Act" coming into full operation, Messrs. Braddock have prepared a LARGE STOCK of METERS, from Two Lights to Three Hundred Lights, which can be supplied on receipt of order.
Globe Meter-Works, Oldham.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications addressed to J. Sugg & Co., Ghent, will receive immediate attention.

EDGE'S Patent for Removing the CARBONACEOUS INCRUSTATION from GAS-RETORTS.
For particulars and terms, apply to E. Goddard, Sole Agent, Gas-Works, Ipswich.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.
N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. Charles Horsley, Agent.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. Baker and Co., late Brierley Hill, Staffordshire.

W. J. SIMMONDS,
Retort and Boiler Setter and Contractor for Gas-Works in general,
7B, SOUTH STREET, NEW NORTH ROAD,
Islington, London, N.
Upwards of 16 years Retort Setter to the Chartered Gas Company, Brick Lane and Curtain Road Stations.
Materials supplied on reasonable terms if required, or labour only.
No connexion with any other Retort Setter.
N.B.—Orders to be addressed as above.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

OXIDE OF IRON.—
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

ALFRED LASS,
ACCOUNTANT.
28, NORTH STREET, WANDSWORTH, S.W.
Mr. Alfred Lass having had considerable experience in arranging, making up, balancing and auditing gas accounts, begs to inform the Directors of Gas Companies that he may be consulted on all matters relating thereto.
Balance-sheets prepared, Accounts audited, Consultations, Agencies, &c.

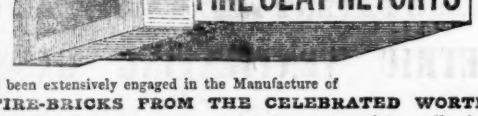
THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS,
&c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

SWANWICK CANNEL.
The yield of this Cannel is liberal, the illuminating power large, and coke good.
For prices and terms, apply to
H. BOAM, 1, Darwin Terrace, DERBY.

THOMAS EDINGTON & SONS,
PHŒNIX IRON-WORKS,
GLASGOW,
MANUFACTURERS OF
GAS AND WATER PIPES,
All sizes up to 4 ft. diameter;
RAILWAY CHAIRS AND SLEEPERS,
and general Castings. Also
GREGORY'S & COCKBURN-MUIR'S
PERMANENT WAY,
London Office: 63, OLD BROAD STREET, E.C.

WATER-WORKS FITTINGS,
SLUICE-COCKS, FIRE-COCKS,
METERS, STEAM FITTINGS,
GAS & HOT-WATER VALVES, &c.,
Of First-class Materials and Workmanship.
BECK & CO., Limited,
Brassfounders & Hydraulic Engineers,
GREAT SUFFOLK STREET, SOUTHWARK, S.E.
Illustrated Catalogues on application.

THOMAS BEAR,
MICA, TALC, AND ASBESTOS MERCHANT,
233, HIGH STREET, BOROUGH, LONDON.
MICA CUT TO ALL SIZES.

WILLIAM INGHAM AND SONS,
WORTLEY FIRE-BRICK AND RETORT WORKS,
Near 

Leeds.
W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.
Estimates for Setting, or Bricklayers sent when required.
GAS OVENS IN SEGMENTS OF EQUAL QUALITY.
A large Stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all Sizes kept in London at Mr. ALFRED WILLIAMS, Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.
N.B.—*Expert orders continue to have prompt attention.*

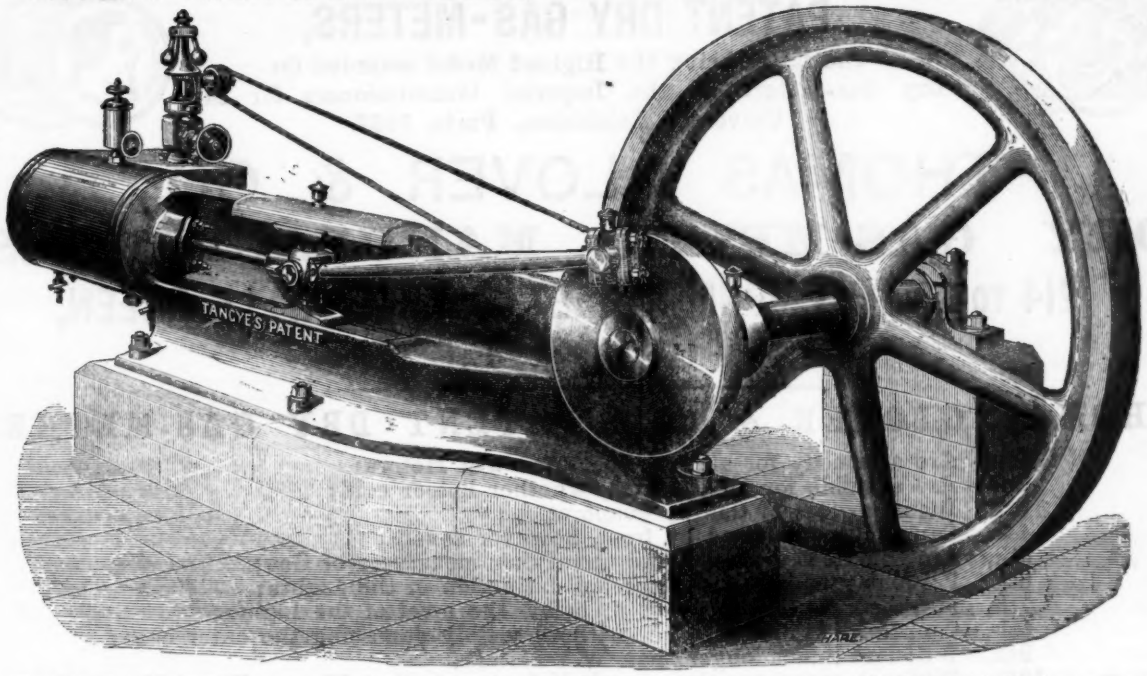
TANGYE BROTHERS & HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.;

And BIRMINGHAM (TANGYE BROS.), CORNWALL WORKS, SOHO.

TANGYE'S

PATENT HIGH-SPEED REGULATING GOVERNOR STEAM-ENGINE.



In this Engine the working parts are considerably reduced in number as compared with Horizontal Engines generally, rendering it far more durable and compact. The bed-plate, front cylinder cover, guides, and plummer-block for crank-shaft bearing are formed of one piece of metal, which in design and proportions is admitted by competent engineers to be perfect, and to afford a strength and rigidity that cannot possibly be attained with the best-fitted Engines of the ordinary horizontal type. The crosshead blocks and all the bearings are adjustable, so that any wear can be readily taken up. The material and workmanship are of the highest class throughout,

The Governor is of a very special description, and combines in the small space usually occupied by the ordinary Steam Stop-valve, a Governor, Throttle-valve, and Stop-valve complete. It is exceedingly sensitive, simple, and compact.

PRICES AND PARTICULARS.

NOMINAL HORSE POWER	ONE	TWO	THREE	FOUR	SIX	EIGHT	TEN	TWELVE
Diameter of Steam Cylinder	3 in.	4 in.	5 in.	6 in.	8 in.	9 in.	10 in.	12 in.
Length of Stroke	6 in.	8 in.	10 in.	12 in.	16 in.	18 in.	20 in.	24 in.
Price of Engine, with Governor and Feed Pump	**£20**	**£27 10**	**£35**	**£45**	**£60**	**£80**	**£100**	**£120**
Price of Engine and Boiler, with Fittings	£43	£56 0	£84	£100	£135	£168	£205	£235

THE "SPECIAL" STEAM-PUMP.

NOTE.

Each one is carefully tested with Steam and Water before leaving the Manufactory.

In case of special quotations, the following particulars are required, viz.—

Pressure of Steam in Boiler.

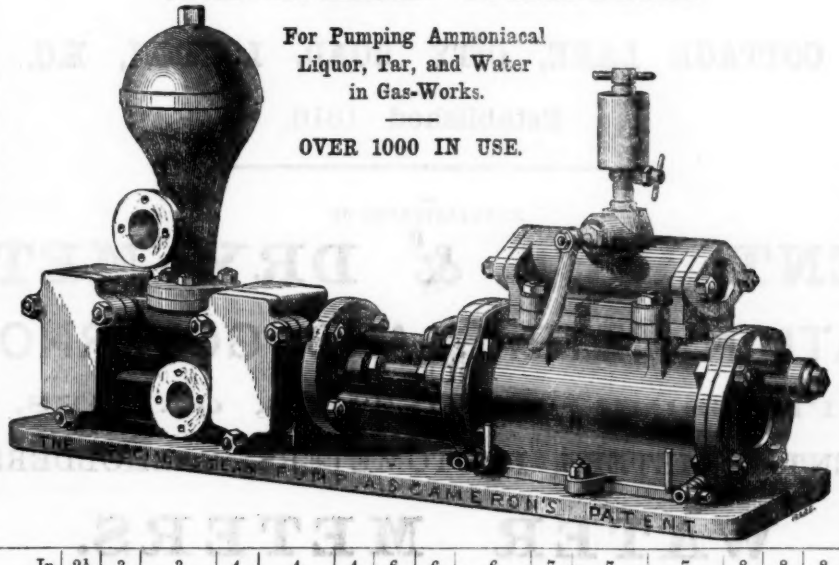
The number of gallons required to be lifted in a given time.

And the height of Lift from level of water to the point of delivery.

In ordering, state the purpose for which the Pump is required, to ensure suitable valves being sent.

For Pumping Ammoniacal Liquor, Tar, and Water in Gas-Works.

OVER 1000 IN USE.



NOTE.

Requires NO Shafting, Gearing, Riggers, or Belts.

All Double Acting.

Works at any Speed, and any pressure of steam.

Will force to any height.

Delivers a constant stream.

Can be placed at any distance away from a boiler.

Occupies little space.

Simple, Durable, Economical.

Diameter of Steam Cylinder	In.	2¼	3	3	4	4	4	6	6	6	7	7	7	8	8	8	8	10	10	12
Diameter of Water Cylinder	In.	1¼	1	3	2	3	4		4	6	5	6	7	4	6	7	8	6	7	8
PRICE		**£10**	**£15**	**£22 10**	**£20**	**£27 10**	**£35**	**£30**	**£40**	**£47 10**	**£50**	**£52 10**	**£57 10**	**£50**	**£55**	**£65**	**£85**	**£70**	**£80**	**£100**

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF

PATENT WET & DRY METERS,

STATION-METERS AND GOVERNORS,

PRESSURE REGISTERS, GAUGES,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

CONTENTS.

Notes upon Passing Events:— PAGE

The Chairmanship of the Metropolitan Board . . . 809
The Proposed New Street from Oxford Street to Coventry Street . . 809
The Educational Boards . . . 809
Unsatisfactory Condition of our Land Defensive Forces . . . 809
The Economical Fever . . . 809
Diplomatic Life at the German Courts . . . 810
The Rage for Competition . . . 810
A Japanese on Railways . . . 811

Leading Article:—
The Twelfth Report of the Medical Officer of the Privy Council . . . 811

Circular to Gas Companies:—
The Metropolitan Gas Accounts . . . 812
Mr. Pole's Notes on the Theory of Gas-Burners . . . 812
Proposed New Gas-Works in Manchester . . . 812
Proposed Transfer of the Bradford, Aberdeen, Perth, Arbroath, and Kilmarnock Gas-Works to Corporations . . . 813
Gas Affairs in France . . . 813
Death of Mr. Samuel Hughes . . . 813

Communicated Articles:—
Notes on the Theory of Gas-Burners, by W. Pole, Esq. . . . 813

Correspondence:—
Gas Fires . . . 815
The Metropolitan Gas Accounts . . . 816

Legal Intelligence:—
Guildhall Police Court—The Gaslight and Coke Company *v.* Robinson . . 816

Miscellaneous News:—
Meeting of the Continental Union Gas Company . . . 816
Meeting of the Ceará Gas Company . . . 817
Meeting of the Singapore Gas Company . . . 817
Disconnecting a Gas-Meter . . . 818
Meeting of the Bahia Gas Company . . . 819
Meeting of the Equitable Gas Company . . . 821
Prevention of the Spontaneous Combustion of Coals . . . 822
Return by the Metropolitan Association of Medical Officers of Health of the Average Composition and Quality of the Metropolitan Waters, in October . . . 822
Presentation to the Chairman of the Cambridge Gas Company . . . 823

Register of New Patents:—
Broadbent, R.—Gas-Governors . . . 823
Farron, S.—Cocks or Taps . . . 823
Powell, J. W.—Valve-Cock . . . 823
Hilton, J.—Socket and Flanged Pipes . . . 823
Brooman, C. E.—Liquid-Meters . . . 823
Chandler, J.—Drawing and Preventing Waste of Water . . . 823
Middlemiss, G. A.—Withdrawing Water, &c. . . . 823
Snuggs, E. A.—Cocks, Taps, and Valves . . . 823
Casella, L. M.—Lighting Gas-Burners, &c. . . . 823
Scholefield, R.—Pumps . . . 823
Walker, J.—Measuring Fluids . . . 823
Leachman and Holroyd—Raising and Forcing Water . . . 823
Price, A. P.—Purification of Coal Gas . . . 823
Evans, A.—Connecting Pipes and Tubes . . . 824
Anderson, F. S.—Obtaining Fuel and Light from Water . . . 824
Applications for Letters Patent . . . 824
Grants of Provisional Protection . . . 824
Notices to Proceed . . . 824
Patents which have become void . . . 824

Gas Share List . . . 824
Price Current . . . 825

TO CORRESPONDENTS.

KERRY.—*We are not aware of any successful experiments in the lighting of a town with gas from Irish or any other peat.*

NOTICES.

The subscription to the JOURNAL is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders should be made payable at the Money-Order Office, London, to William B. King, 11, Bolt Court, Fleet Street, by whom the business department of the JOURNAL is conducted.

SCALE OF CHARGES FOR ADVERTISEMENTS.

Six lines and under . . . . . 3s. 0d.

Sixpence per line for every line additional.

Special contract for advertisements intended for continuous insertion.

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, NOVEMBER 8, 1870.

Notes upon Passing Events.

THE Metropolitan Board has, after a sharp fight, settled the principles on which it will select its new chairman. One party desires to imitate the English municipal corporation principle, in which the office of mayor is generally purely ornamental. A new mayor every year gives every member a chance. Occasionally, in provincial towns, the same gentleman is elected year after year; but this is when he is rich, and the expenses of office are in excess of the regular salary. In Scotland a provost holds office for three years, and is often re-elected. This is a plan commending itself to common sense. Another section in the Metropolitan Board proposes to confine the election to the present members, but make the appointment permanent. A third desires to select some powerful parliamentary personage from the outside. A chairman annually elected, but with the understanding that, as long as he is competent, he shall be re-elected, seems the most sensible arrangement where this officer is not a mere part of a pageant, like the Lord Mayor; and this is the plan that has for the present been adopted.

It is satisfactory to learn that at length the parishes interested have arranged with the Metropolitan Board to open a thoroughfare from Oxford Street to Coventry Street, and thus to Charing Cross and the Thames Embankment, which ought to be the line towards which several streets from the north of London should tend. Public will and public demands have grown with this the latest and most magnificent thoroughfare improvement, and the question of further progress is purely financial. If Mr. Bruce succeeds in passing an harmonious system of municipal government for the whole of the metropolis, a great metropolitan debt will follow, as a matter of course, to enable the new councils to proceed with new improvements with all the activity of new brooms.

We see the straws showing the winds of future municipal governments in the zeal with which some people of very little education are canvassing for seats in the Educational Boards. There will be some very odd representatives of the art of teaching in the first Boards; but no matter. Some only look on these Boards as the steps to becoming Common Councilmen and Aldermen; others are in earnest. A little time will sift the wheat from the chaff. We are not amongst the enthusiastic believers of the virtues begot by manual labour, but, in this instance, we have not the least doubt that intelligent mechanics are more in earnest about advancing real education than the money-making shopkeepers who are foremost in parochial affairs.

The unsatisfactory condition of our defensive forces on land continues to be hotly discussed in the columns of newspapers. There is a wide margin between those who are perfectly satisfied with existing institutions, as approved at the Horse Guards and War Office, and gentlemen like Mr. Trevelyan, who want to make a clean sweep, and build up a spick and span new army. This only is certain, that if it is worth while to have a regular army, a militia, and volunteers at all, it is worth while to have them all efficient and in harmonious relation to each other. At present the Guards and other crack regiments—that is, regiments officered by rich or aristocratic men—look down on the line, the line on the marines; the light cavalry despise the heavy, and the Household cavalry, that never see service, take precedence of those that serve in all quarters of the globe. The regulars of all regiments look down on the militia, and sneer at the volunteers; while the volunteers severely criticize the other two branches of land defence. The idlest cornet in a lancer regiment thinks himself far above an officer of artillery or engineers. This is not business, and to a business test our army must be brought. If not—if the home army is a purely ornamental force—if we are to rely on the salt-water ditch and the navy—the sooner we dispense with the parade and cost of the home forces the better. Prussian officers are all aristocrats to the backbone, often arrogant and insolent, but they must all know their duty or retire. With them, in the strictest sense, "*noblesse oblige.*"

The fever for economy which has for some years raged in the House of Commons was, amongst other public departments, directed last year to the diplomatic and consular services, in the shape of a select committee. The evidence is now before us, and is amusing, if not very instructive. Wonderful are the powers of evasion of the clever men trained in the diplomatic department. Sam Slick tells us that the Yankee "never steals—he knows better. He "makes more by taking an advantage." The adept of the Foreign Office never tells a lie or refuses to do anything the House of Commons requires; he is content to mislead, to evade, and do something that is not what was wanted, but very like it. The Right Honourable Edmund Hammond, the Perpetual Under-Secretary of the Foreign Office, is a very able, and no doubt a perfectly honest gentleman; but no criminal, under the examination of a French *juge d'instruction*, ever showed more ability in avoiding giving information than did Mr. Hammond. Amongst the subjects on which he was examined was the system of letter-copying, the cost of Queen's messengers, and the position of Foreign Office agencies; but whenever on these or any other subject the question was inconvenient, Mr. Hammond's ignorance was really sublime. For instance, Mr. Rylands was anxious to get from Mr. Hammond an admission that we maintained diplomatic establishments at courts too insignificant to repay the cost. But he did not succeed. "Can there be more than seven or eight "states in Europe between which and this country real interna-"tional business can be carried on?" was the question. "My "answer is, that in every state where we have either an ambas-"sador or an envoy, international business of very great import-"ance, in different degrees, is carried on." The word "degrees" covers everything. From a return read, it seemed that Bavaria cost over five thousand a year; Belgium a little more; Denmark the same; Greece over six thousand; the Netherlands

the same as Belgium; Portugal the same as Greece; Saxony a little over one thousand; and Wurtemburg about three thousand five hundred; while, it is to be presumed, for royal domestic purposes, Hesse Darmstadt and Saxe Coburg cost each about nine hundred pounds a year. Being asked if the work of new missions is not of the most menial and routine character, and if the ministers and secretaries have not great difficulty in filling up their time, the Permanent Under Secretary, who is the medium of communication, "is perfectly unable to "answer that question." Again, he is asked, "Are not the con- "ditions under which diplomatic action is carried on very diffe- "rent from the circumstances of former times?" Cautious Mr. Hammond asks, "What time do you speak of?" "A hundred "years ago." Mr. Hammond, "I am rather old, but I cannot say "what happened a hundred years ago." So Mr. Rylands was sold. Mr. Hammond was next examined about the position, use, and emoluments of Queen's messengers. These officers carry the dispatches of the Foreign Office to and from the various embassies. The pay at present is four hundred a year, with an allowance of £1 a day for travelling expenses. Formerly they had to post. Every messenger had to keep a posting carriage at Calais. Then they had perquisites in carrying the money and dispatches of financiers and bankers, and sometimes sold the one seat in their posting carriage. In the good old days, Foreign Office messengers even saved fortunes; now they can barely live. In the good old times these posts were often given to faithful servants, to non-commissioned officers, and people of that sort. Except in the case of travelling in time of war, the Foreign Office messenger does not require more intellect than a general postman; but some years ago, when reforming zeal had cut down a good many berths, retired officers of the army, and other men of good family or parliamentary connexions, were glad to take the income of a Queen's messenger. So it was decided that candidates should know at least one foreign language. Lord Palmerston made a relation a Queen's messenger. Mr. Hammond chose to ignore the fact, well known to him, that ex-butlers and footmen had been excellent Queen's messengers within the reign of Queen Victoria, and he did not like to admit that the universal European railway map had made any difference in the duties of these confidential letter-carriers. But, although Mr. Hammond formerly approved of messengers of no rank and no education, he now thinks that, to carry a parcel by rail or by steam to Madrid or Constantinople, "you want a man well conversant with foreign "languages and with travelling on the Continent—a man of "superior qualifications." We do not believe that it is worth the nation's while to save anything on this small item, but will venture to assert that not more than one messenger knows Russian or Turkish, and not half of them German or Spanish. With a railway guide, a uniform, a silver greyhound, and a bag of money, they can go anywhere, and do anything they have to do. It was suggested that the time of the Foreign Office clerks—gentlemen presumed to be of superior education—was very much taken up with work that in some cases copying clerks at moderate salaries, and in other cases a machine, could execute as well, and better. It seems feasible that educated gentlemen should grow sick of copying. Mr. Hammond does not agree with these suggestions; he likes men with university honors to spend years in copying formal documents, and he hates copying-machines. No doubt, in his heart, he prefers a post-chaise to a locomotive-drawn carriage. Mr. Hammond has so much to do "he seldom has time to read the *Times*." Mr. Hammond "has a very great personal objection to copying-machines. The "Board of Trade uses them, and the papers come in so damp that "it almost gives him a cold to read them." This is almost as good as Beau Brummel, who caught cold from a damp stranger being shown into the same coffee-room. "The copied letters come "to us on what in technical language is called 'flimsy.' They are "unpleasant to read. They are written widely (?), and take up a "monstrous deal of space, and will cost double or treble the "sum for binding! We are at times obliged to go back years "and years to get at the history of a case, and if our papers were "not well and securely bound, if they were lost or damaged, we "might be seriously put to from adopting a system which I very much "disapprove of." "I object to the system, because it is not so expe- "ditious as hand copying." Mr. Hammond also objects to keeping copies of letters in books, not caring to be aware that many great firms, with ten times the daily correspondence of the Foreign Office, keep their copies on files, and bind them periodically. Of course, this is all nonsense, which helps to show that no detail reform—no penny postage—no electric telegraph—no steam-ships, iron ships, rifled great guns, or breech-loading small arms—can be introduced where admirable old gentlemen of Mr. Hammond's calibre of mind have the command of the situation. His evidence on Foreign Office agencies, lately ordered to be abolished under the pressure of the House of Commons, is still more suggestive and amusing. Certain gentlemen in the Foreign Office got into their hands the agencies—that is, the transaction of the private money business—of diplomatic and consular officers. They received and paid for them, and charged a commission on the business. From these perquisites of brokerage certain Foreign Office clerks derived very large incomes, far exceeding their official salaries; indeed, it was commonly reported that at least one gentleman accumulated a fortune. It is understood that when a clerk in the Foreign Office became an under-secretary, he sold the goodwill of his business to his successor, and sent out a circular to his correspondents abroad. All this is common talk in the ante-chambers of ambassadors and the offices of consuls. But the committee got nothing out of Mr. Hammond in answer to their questions; he is deaf, and dumb, and blind to anything out of his routine of duty. It was also popularly believed that those who were good customers to the Foreign Office agent had better chances of advancement—in fact, stood better in the Foreign Office books than those who employed private agents. "I presume," asked Mr. Rylands, "that the fact of a Foreign "Office agency being connected with the position of clerk in the "Foreign Office would not prevent the Secretary of State from "removing or pensioning such clerk, or even arbitrarily dis- "missing him, and that in such case he would have no claim for "compensation?" Mr. Hammond answers, "Of course not, "for his emoluments as agent would cease with his employment as "clerk." But, nevertheless, Mr. Hammond argues in favour of compensating the clerk who holds this private appointment when it is abolished. The point of Mr. Ryland's question lay in the common belief that a clerk, incapacitated by his health from real work, is holding on to the Foreign Office for this compensation. Mr. Hammond does not approve of the House of Commons interference. He says: "The Foreign Office is a well-abused office. "If a member gets up in the House of Commons and says, 'Here "there is fraud and here there is oppression,' we cannot descend "into the arena of the newspapers" (which he never reads). Then asks Mr. Butler-Johnstone: "If a newspaper article advo- "cated the abolition of the Foreign Office, the Foreign Office "would at once collapse without making any defence?" The last bit of Mr. Hammond's evidence is, to those who know the circumstances of the case, not the least amusing. He takes credit for the work of the engineer, Sir Charles Hartley, who, under the employment of the Commission for Regulating the Navigation of the Danube, has so deepened and lighted the access to that river as to make it safe to the navigation of the ships of Europe. Before the Crimean War, Russia exercised her influence to keep the mouths of the Danube as difficult and dangerous as possible; next to Russia, the most obstructive obstacle was the department over which Mr. Hammond presides. It was the mercantile interest, through the House of Commons, which gained the ear of Lord Palmerston, and pressed measures for commercial advantage, to the great disgust of the old traditions of the Foreign Office.

Mr. Labouchere, who was formerly in diplomacy and is now in violent opposition, gives a nice idea of the state of life in the small German courts. His evidence is evidently taken from the same point of view as the sketches in Lever's novels. Mr. Labouchere says the minister at Munich has four thousand a year. For eight months of the year he lived seventy miles from the capital. "He "came in once a month, but there was nothing to do!" The first secretary of legation was away on leave, as also the second secretary. Two *attachés*, one of whom was very sick, had to *viser* passports, but now there are no passports to *viser*. Once they were so hard up for materials for a dispatch, that they made one about the royal wet-nurses. The English minister never invited any of the Bavarian House of Representatives to dinner; they are not "in society." "In a small German court, no person who is not 'well born'— "that is, noble—is admitted into society. The nobility are gene- "rally very impoverished, and pick up a living by being chamber- "lains and *aides-de-camp* about the court. There are persons "who are entertained by a British minister, but, as a rule, "members of the cabinet, not noble, are not in society. There "are some professors, with seven hundred or eight hundred "a year, who are in society; but they do not entertain them- "selves, and seem rather out of their element." On the other hand, at Washington everything is twice as dear as in England, and it is an important part of the duty of the minister to give dinners. Therefore, Mr. Labouchere thinks the salary of that post should be increased, and all the little German missions abolished.

Sir Henry Lytton Bulwer gives some very useful evidence in reference to that rage for competition, with prizes in public appointments, which it seems the mission of a certain class of radical reformers to cultivate, thus falling from the frying-pan into the fire in their anxiety to avoid the jobbery in favour of the ignorant and stupid, formerly created by parliamentary patronage and aristocratic influence. "In all the countries I have visited "(and I have visited a great many), the thing most detrimental

"to society and to public service has been a passion for Govern-
"ment places. I am afraid we are introducing into the public
"here a general desire to get their sons into public places. This
"takes away a great deal of the general stock of energy in the
"country. Ambitious, clever young men succeed in competitions.
"Once in inferior grades, their advance is very slow, and their
"original talent is nullified in official routine. You cannot test
"by competitive examination the competence of a man for diplo-
"macy. For instance, firmness of character, suavity of manner,
"self-confidence without presumption, and other qualities, are
"more important than mere learning. These cannot be tested
"by any examination. An examination is necessary to prevent
"incapacity, but no examination can test capacity. I was at
"Harrow five years, and there is not one of the very clever boys
"I remember there who has ever done anything in public life, or
"in life at all. The fact is, that energy of character in public life
"is the thing that succeeds most, and it is generally the boys
"who have not energy who pay the most attention to lessons."
Sir Henry Bulwer is in favour of two strict examinations. In the first he would include, after a thorough knowledge of English composition, the power of speaking and writing French elegantly and correctly. In the second examination he would include public law. In a word, he would have a collection of thoroughly well-educated cadets, from whom a diplomatic minister might select the subordinates who were to assist him, and for whom he was responsible, instead of taking the top names of a competitive list, and forcing them as *attachés* on a minister. This recommendation applies to other departments beside diplomacy. But competition is the mania of the hour.

The Chinese refuse to allow Europeans to introduce railways into their empire. Greece still languishes for need of common roads, while wasting funds on aggressive schemes; and in many European states locomotive improvement is grossly neglected. The following essay by a native Japanese, on the subject of railways, gives a high idea of the intellectual vigour of that remarkable people. It is extracted from a recently issued Blue-Book:—

The quality of our land and sea produce in some articles is equal, or even superior to that of Europe. The national capacity of our people, whether manifested in politics or in literature, is such as we need not be ashamed of. But the energy of our people is on the decline; the national debt is on the increase; the voice of the poor in their misery fills the streets. Why is this?

Our communications by land and sea are not free; our eastern and western provinces are distant from each other, and their language and manners are different, so that they are to each other almost like foreign countries. Hence the price of commodities and the value of the circulating medium are far from being on a proper level. Our wealth goes into the pockets of the foreign merchants, instead of promoting the good of our country and the happiness of our people. How painful is this! We now approach to our subject—the introduction of telegraphs and railways. We advocate it not for the love of unnecessary trouble. But our opponents argue in return that the national means have become scanty, from the sufferings to which our country has been exposed, and that, therefore, we should dispense with the merit of successful public works and machinery. Let us, they say, establish no new regulations, but maintain our old laws, and by them again bring the country to a prosperous state. Another party objecting argues:—Railways and telegraphs are no doubt very useful inventions; but in the career of a nation there are periods of rise and fall; there are rich countries and there are poor. We should try to improve our own by our old methods, and gradually bring it to the same state of greatness and civilization as the others, rather than introduce into it inventions which will only astonish our people's eyes and frighten their ears.

The two foregoing arguments are no doubt entirely without some reason, and they evidently proceed from minds labouring under a consciousness of our present misfortunes, combined with feelings of great benevolence towards the people. But these are narrow views; these minds are small; they look at heaven, as it were, through a hole in a small bamboo. I maintain that the future of a country lies in its people, and the way to enrich the people is to encourage the productions of industrial labour. In these efforts the economy of human labour is of paramount importance. This is only possible by the introduction of telegraphs and railways. If a proof for this assertion is wanted, we need only look to the condition of those nations which we now call great and highly civilized—say England or France—and a hundred years ago, when they had not been able to overcome the disadvantages of an exclusive employment of human forces for labour of all kind. Since the introduction of railways and telegraphs into those countries a hundred other useful and profitable discoveries have been added, and distances of thousands of miles are now traversed by horses, or waggons, or boats in a moment. Government despatches its orders in all directions with celerity and promptness. Thus have the present wealth and power of those countries been created.

These are the last and incalculable advantages of telegraphs and railways. If we calculate the expenses of our present postal system connected with the Tokaido, we find that, in addition to the forced labour performed by the peasantry, there is an additional annual subsidy required, amounting to 2,000,000 rios. The people of the towns through which the high road runs are, therefore, extremely poor, and suffering in their unmitigated misery. Their old parents are neglected; mothers cannot marry their daughters. Indeed, painful is the contemplation of these facts. They cannot be left without assistance, they must soon receive relief.

The present annual subsidy of £2,000,000 per annum for ten years would form a capital of 20,000,000 rios; whereas the expense of introducing railways and telegraphs on that road would amount to not more than half that sum.

The present subsidy for five years would thus alleviate the sufferings of millions, and would open up sources of profit, which would endure for millions of generations. Let us not listen to the arguments of those who object to the introduction of railways and telegraphs. The consideration of other advantages, such as the connexion of the two centres of our political system, the capitals of Tokei and Kioto, need scarcely be added in support of our views. The government of the whole country emanates from these two towns; the voice from the one ought to be day by day heard in the other. Any impediment or delay in their communication would be detrimental. This may serve as a conclusive proof of our argument, that the introduction of railways and telegraphs would promote the establishment of an unlimited and everlasting benefit to the nation.

THE TWELFTH REPORT OF THE MEDICAL OFFICER OF THE PRIVY COUNCIL.

In these days, when "fœcal" diseases, or diseases produced by the excremental poisoning of air or water, are always more or less prevalent, it is praiseworthy of the medical department to occupy themselves with the question of the disposal of human ordure. Necessarily in their hands the inquiry is conducted mainly from a sanitary point of view; but the economic considerations are not altogether neglected. As the matter is of great public importance, we give, very briefly, a summary of the conclusions arrived at by Dr. Buchanan after an examination of many places where the dry earth system of dealing with excrement is in use; and the results of an inquiry, by the same gentleman and Mr. Radcliffe, into the construction and use of midden closets in many of our large northern towns.

A dry earth system, not always exactly that proposed by the originator, has come so far into use that Dr. Buchanan is able to give the results of its application in large public institutions, in villages, and, on a limited scale, in a large town. The conclusion shortly stated is that the system furnishes a means of disposing of excrement, certainly without nuisance, probably with profit, and possibly without detriment to health. Naturally the attainment of these results implies care on the part of the population, and vigilance on the part of the authorities. The best results may, therefore, be looked for where severe discipline is maintained; and accordingly we find that, as carried out in gaols, the system is most effectual. It is scarcely less so in large schools. There is, however, one unfortunate exception to the general healthiness of the large institutions in which the system is in use. At the Broadmoor Criminal Lunatic Asylum there has been, and there still is, we believe, a good deal of a peculiar fever which may or may not be a "fœcal" disease. Whatever it may be, however, it exists and continues coincidently with the use of the dry earth system. Dr. Meyer, the superintendent of the asylum (who, by the way, has died of fever since this report was written), attributed the disease to, among other causes, the position and construction of the original water-closets; and these have now been replaced by earth closets. But the disease still goes on. It is well to remember that a system of sewage irrigation is carried on at the same time. When water-closets were in use the sewage was filtered, and the liquid portion only run on the land; but now, as no solid matter enters the sewer, the liquid refuse is distributed as it leaves the building.

In this particular and most important case we do not look on the inquiry as so full and complete as it might have been. We are not told how much land is irrigated, nor what is the nature of the soil, nor the state of the drainage. Neither have we any information as to how the saturated earth from the closets is finally disposed of. We regard this case as one which deserves a full and candid inquiry, for the sanitary effects both of the earth system and of irrigation are to some extent brought in question. In an economical point of view, however, the success of the earth-closet even here is certain. A considerable sum formerly expended in the repair of water-closets is saved, and the asylum requires but half the previous supply of water, by which the expense of much pumping is spared.

In the Dorset and Lancaster Gaols the success of the earth system is more complete. At the former the saturated earth is sold, and produces about £50 a year, or something like £1 per ton. At the Dorset Grammar School, earth passed twice through the closets is considered by the contractor to be worth between £2 and £3 per ton. In both these a considerable saving of plumbers' bills is effected by the substitution of earth for water closets.

The best illustration of the application of the system is, perhaps, to be found in the village of Halton, where Mr. Moule's closets are in use; but, as fairly stated, this experiment has been made under exceptionally favourable circumstances. Halton was healthy before the system was introduced, and has continued healthy since. In Lancaster earth-closets are in use to a limited extent under the superintendence of the Corporation, and appear to give perfect satisfaction to the authorities and to Dr. Buchanan. The plan adopted at Lancaster differs from that in use at any other place, and makes it difficult to arrive at the economic results; but this much appears certain, that some small profit is realized. We believe, however, that the best economic results will be obtained with rural populations of moderate numbers, and we give Dr. Buchanan's estimate of the cost of carrying out the system in a village of 1000 inhabitants. Supposing the owners of property to have made the necessary alterations in the closets, the local authority charged with the superintendence will require to make an outlay of £250, and incur a weekly expenditure of £4 15s; in other words, an annual cost (including interest) of £260. The quantity of manure to be expected from the closets is 730 tons a year, and the cost of production is 7s. per ton. At Halton, earth passed *once* through a closet is supposed to be worth £3 per ton;

at Dorset Gaol it actually fetches about £1; but, taking it as worth only 10s., a clear profit is left on the working. More concentrated manure at Dorchester School sells for £3 per ton, and Dr. Buchanan estimates that, by employing the earth four times over, his model village would produce an income of £600 against an annual outlay of £244.

Want of space prevents us from entering upon the objections to the earth system, all of which are satisfactorily answered by Dr. Buchanan, so far as present experience can help him to answer them. As regards the sanitary part of the question, an outbreak of typhoid fever or cholera might at any moment scatter all his conclusions to the winds; but at present he is quite justified in concluding that the earth-closet, intelligently managed, furnishes a means of disposing of excrement, without nuisance, and apparently without detriment to health, and that the system will, at all events, pay the expenses of its management. The limits of its application cannot be stated; but in towns favourably circumstanced it might at once be applied to populations of 10,000.

The middens in our northern towns were once regarded as unmitigated and unmitigable nuisances. They have, however, been gradually brought under discipline by the local authorities; and, except in one or two towns, they are for the most part void of offence. One of these exceptions we may mention at once. It is Birmingham—a town without any medical inspector, and against which any enthusiastic sanitarian must needs have a spite. The sanitary arrangements and the water supply are of the worst possible description, and yet the town obstinately continues healthy. "At present it is common to find huge, wet, fœtid middens—uncovered, undrained, unemptied—some of them as big as the foundations of an ordinary cottage. Few of them are covered. Many are under workshops where work is done amidst stench all the year round, and among swarms of flies in summer." And yet enteric fever is not common in Birmingham, and cholera passes the town by. Would that Dr. Buchanan and Mr. Radcliffe would honestly seek to account for this singular exemption of an excrement-sodden town from "fœcal" diseases! There can be no reason, however, why Birmingham should not be compelled to reform its midden system, like Liverpool and Rochdale. A comparatively healthy town might be made healthier by it, and, as at Rochdale, some profit might be made.

It is impossible to refer to all the towns mentioned in this report. We allude to Liverpool and Rochdale because, in the former, the improvements have been made as a purely sanitary precaution; while, in the latter, it is endeavoured as well to procure some economic result. In the report we notice, drawings and descriptions are given of the various forms of midden closets in use; and here we may remark that it would be well if the paper to which we now allude were published separately. As often happens in Government reports, a small amount of information, interesting to many, is bound up with a mass of matter of interest or intelligible to but few. This is the case in the volume before us; and for that reason we think that the separate publication of Dr. Buchanan and Mr. Radcliffe's reports is desirable.

In Liverpool the improvement of the midden closets has been accompanied by the extensive introduction of trough water-closets, from which the best results have been derived. The simple condition of success, as regards the prevention of nuisance here and elsewhere, appears to be the frequent removal of the contents, and perfect cleanliness.

In Rochdale, with 9000 houses, there are 4000 midden closets, and only 300 water-closets. The pail system is here, as far as possible, adopted—a little fine ash and a handful of salt being placed in each pail before it is used. The pails are removed once a week or oftener, according to the requirements of the case; and they are covered and taken away in a closed van, without emptying the contents, and thus all nuisance in passing through a house or through the streets is avoided. The financial results of the experiment commenced at Rochdale are highly satisfactory; and Mr. Alderman Taylor estimates that if the whole of the middens were converted into pail closets, the value of the produce would equal a rate of 3d. in the pound on the property in the town. There is, then, so far, sufficient to encourage other towns to follow the example of Rochdale in endeavouring to make a profit in dealing with excrement.

In summing up, we may say that four things appear clear: That the water-closet system is the most expensive and wasteful of all devised systems; that it affords the least chance of dealing profitably with a material which, beyond all doubt, possesses a high value; that midden closets, if properly constructed and vigilantly looked after, may be used without offence, and that the pail system offers the best means of profitably disposing of excrement; and, lastly, that the earth-closet system, in limited rural populations, is calculated beyond all others to succeed in producing the highest economic, and the best sanitary results.

Circular to Gas Companies.

A CORRESPONDENT, whose means of information and experience in the analysis of gas accounts are entitled to respect, favours us with a communication on the metropolitan gas accounts, an abstract of which appeared in our last. In this letter an attempt is made to institute a comparison between the companies by increasing and reducing the prices actually charged by them to the uniform rate of 4s. per 1000 cubic feet, and striking off, both from the debit and credit sides of some of the accounts, items which are peculiar to certain of the companies—such as the charges for gas referees, pensions, &c., and receipts for meters. We cannot, however, agree with our correspondent in estimating the equivalent of cannel gas at only 4s.; and this error vitiates the calculations so far as those companies are concerned who supply cannel gas either wholly or in part. The calculations, however, place the South Metropolitan Company at the top of the tree, both in respect of the profit per cent. on gas-rental and on the capital. The following are the comparative figures shown in the abstract we published, and those as corrected by our correspondent:—

Name of Company.	Profit per Cent on Gas-Rental.		Profit per Cent. on Capital.	
	As per Abstract.	As Corrected.	As per Abstract.	As Corrected.
South Metropolitan.	34·69	46·18	11·59	18·57
Phœnix	46·06	45·83	9·71	9·54
Equitable . . .	45·82	44·74	12·91	12·67
Surrey Consumers .	40·04	40·04	9·56	9·55
Commercial . . .	39·28	39·28	12·11	12·11
Imperial	40·36	38·48	11·09	10·58
London	37·94	36·51	8·39	8·07
Independent. . .	27·92	36·33	8·84	13·61
City Company . .	34·86	35·58	8·51	8·56
Western	33·14	30·78	10·45	9·71
Chartered . . .	22·42	26·61	4·82	5·92
Ratcliff	28·87	22·83	8·44	6·02

No calculations appear to have been made from the accounts of the Great Central Company.

In another place we publish the second part of Mr. Pole's "Notes on the Theory of Gas-Burners," and specially on the relation between the consumption of gas and the light given. In this paper the author applies his theorem to recorded experiments, and shows how far the calculated results disagree, or we might say how nearly they agree with the results calculated according to the law of direct proportion. That there is a "normal range" for every kind of burner is made perfectly clear; and it seems equally clear that within this range the difference in the results, calculated by the old or the new law, is but small. Making due allowance for possible imperfections in instruments, and errors in personal observation, it does seem remarkable that the results calculated by the two methods should so nearly agree. The application of the new law to direct experiments made with the instruments the referees have at command, such as no photometric observer ever yet had at his command, is all that is wanted for the demonstration of its truth.

The Corporation of Manchester are thinking—and none too early, it appears to us—of erecting additional gas-works, and have selected a site on the Bradford Road, and near to the Philips Park. Hereupon has arisen a clamour such as our readers will remember arose when the Chartered Company attempted to obtain some land in the vicinity of the Victoria Park, London. Strangely enough, the opposition raised to the acquisition of the proposed site by the Corporation of Manchester is led by Mr. Crace Calvert, F.R.S., a chemist of some eminence in his way, but who, in this matter, is shown to be hopelessly wrong. Mr. Calvert's objections are twofold: the first is that the ground is so much above the level of the locality to be supplied with gas that it would be needful to use considerable pressure, and this pressure means increase in price of gas. The answer made to this by the chairman of the Gas Committee is, that the site is, in fact, only 10 feet above the level of one of their existing works, with which no difficulty is experienced, and is, indeed, below the greater part of the district to be supplied. Mr. Calvert subsequently plunged deeper into error, and talked about the cost of the works to the ratepayers, and the enormous rates the sum required for the works would represent. It is difficult to imagine an inhabitant of Manchester, other than an Irish labourer, in such complete ignorance of actual facts. The gas-works of Manchester have never cost the ratepayers anything; but, on the contrary, as the report we published in our last clearly proves, have produced a profit, applied to city improvements, which, if the money had been raised by rate, would have required one of 6d. in the pound. Lastly, Mr. Calvert blundered in a way which in him is even less excusable. The most popular objection to be brought against the proposed site was the damage the works were likely to do to the vegetation in the new park. On this point Mr. Calvert was eloquent on the subject of sulphur. Works of the magnitude designed would, he said, discharge into the atmosphere

from 24 to 25 tons of sulphuric acid weekly. In arriving at this prodigious amount, he appears to have assumed that half the sulphur in the original coal remained in the coke, which was equal in weight to the coal distilled, and also that the whole of the coke produced would be used in firing the retorts. Of course, neither assumption is correct. Alderman Rumney, who, though not an F.R.S., is probably as good a chemist as Mr. Crace Calvert, is at pains to explain that the coke produced is only from 12 cwts. to 13 cwts. to the ton of coal distilled, that only four-tenths of the coke is used in the works, and that this coke contains only one-fourth of the sulphur to be found in an equal weight of the coal. All the objections, therefore, on scientific grounds, are fully answered. As a fact, gas-works, *per se*, are not inimical to vegetation. Where there is an enormous consumption of coal, as in our northern manufacturing towns, vegetation will not flourish; but the injury produced by gas-works is as nothing compared with that done by some single factories, like one mentioned by Alderman Rumney as existing near the Philips Park, consuming from 500 to 1000 tons of coal per week. In this case the sulphur in the coal is at once discharged into the atmosphere, in the form of sulphurous or sulphuric acid; while of the sulphur in the coal carbonized in gas-works, the greater part is retained in the purifiers, while the remainder is distributed over a wide area. Any one who will take the trouble may very soon satisfy himself that gas-works are not injurious to vegetation. Without going far from London he may find luxuriant kitchen-gardens and blooming conservatories almost under the eaves of retort-houses.

The system of investing the gas supply of large towns in the hands of the local authorities is unquestionably extending, and the intention of five municipal bodies to apply to Parliament in the next session for powers to purchase the gas undertakings in their respective localities is already announced. These are Bradford, Aberdeen, Perth, Arbroath, and Kilmarnock. The terms of the purchase of the works at present supplying gas in those towns have only been settled in the cases of Arbroath and Kilmarnock. In the latter case, the directors of the gas company have agreed to accept the offer of the Police Commissioners, who propose to pay to the shareholders the sum of £36,000 in respect of their paid-up share capital of £24,000, and to take over the bonded debt of the company, amounting to £4500. The commissioners are also to pay the expenses of the transfer and of the Act of Parliament, the term of entry to be at the termination of the first financial year of the company after the Act has been obtained, or not later than June 14, 1872, when the money would be payable. With respect to the distribution of the premium of £12,000 between the old and new shareholders, the directors took the opinion of Mr. Anderson Kirkwood, of Glasgow, who advised the allotment of £7800 to the former, and £4200 to the latter. This recommendation was unanimously adopted. In all the other cases it is more than probable that terms may be agreed upon at the last moment, for all parties must have a just dread of arbitration.

The meeting of the Continental Union Gas Company at the present moment furnishes matter of general interest. Up to the end of the time included in the accounts presented to the meeting the affairs of the company were very flourishing, and, indeed, cannot be said to be otherwise now. With the important exception of those at Strasburg, the gas-works belonging to the company have not yet suffered from the operations of war. At Strasburg, as might be expected, the injury to the works has been very great; the gasholders and purifiers have been much damaged, and the chimney has been destroyed. Fortunately the benches of retorts have not been much injured by the bombardment, and it is hoped that the mains have escaped with little damage. It is expected, therefore, that the lighting of the city will soon be resumed, particularly as the Prussian authorities are giving every encouragement and help to the company. The shareholders will learn with some satisfaction that the richer quarters of the city, from which the company derives its largest revenue, are comparatively uninjured, the devastation being greatest in the poorer suburbs. An important sentence in the report, to the effect that the cost of the repairs would be repaid to the company, provoked a shareholder, more curious than politic, to ask by whom. The question, of course, received no answer. Montargis, where the company have works, is not a fortified town, and therefore the fate of the gas-works depends upon the conduct of the inhabitants, or the resistance offered by troops, who are not at present in the neighbourhood. The works at Rueil are in dangerous proximity to Mont Valérien, and will probably suffer if the Germans erect batteries in the neighbourhood. Nismes and Vienne, where the company also have works, are probably beyond danger. In Paris, up to this time, the supply of gas has not been interrupted; but two-thirds of the public lights are said to have been extinguished, and the shops are closed at a much earlier hour than usual, to diminish consumption. The advance of the German armies on Rouen and Amiens may endanger the works of the European Gas Company in these cities, should any attempt be made to defend them. Those at Rouen, which are situated on an island on the river Seine, are particularly exposed.

It is with sorrow that we announce the death of Mr. Samuel Hughes, whose name in connexion with the metropolitan gas agitation, during the last 15 years, has become well known to our readers. It has been our duty to differ with Mr. Hughes on many matters involved in this and other contests, but we never doubted his honesty and sincerity; and now that he has passed away, it may be some consolation to his friends to know the esteem we bore him. His death occurred on the 31st ult., from paralysis, which had followed an attack of bronchitis, to which he was subject.

With this number of the JOURNAL we present to our subscribers the eleventh of the series of drawings of the Chartered Gas Company's new works at Beckton.

Communicated Article.

NOTES ON THE THEORY OF GAS-BURNERS.

No. II.

On the Relation between the Consumption of Gas and the Light given.

In continuing this branch of the subject, it is proposed to compare the new law enunciated in the last paper with experiments on record, and to show that, by its accordance with them, it possesses a fair claim to consideration.

The law is, that in a given burner, taken through its normal range, the light given varies as the quantity of gas consumed, *minus a constant quantity*. That is, if L represents the photometric amount of light produced by the consumption of q cubic feet of gas per hour, then

$$L = A(q - c),$$

where A and c are constants for the same gas and the same burner.

We have now to see how the quantities calculated by this equation will satisfy the actual results of experiment, in the various cases that can be brought forward as examples.

The earliest experiments are those of Christison and Turner, made in 1825, and recorded in the paper already quoted. It must be recollected that at this early time the science of photometry was in a very infant state. Much of the paper is devoted to a discussion as to what kind of photometer should be used; and the experiments were probably the first series of comparative photometric trials ever made with different consumptions in the same burner. We cannot, therefore, be surprised at finding the results somewhat crude and irregular.

Again, it is unfortunate that the experimenters only give *comparative*, and not *positive* values of the consumption; the units of measure and time are not stated. They will serve, however, equally well to test the *form* of the equation.

There are four sets of experiments available—two with single jets, and two with Argand burners.

Single Jet. Coal Gas.

Here A = 1·74, c = 36·5.

Proportional Consumption = q.	Light = L. As Recorded.	Light = L. As Calculated by Proposed Law.	Difference.
60·5	55·6	42	− 13
101·4	100·0	113	+ 13
126·0	151·0	156	+ 5
144·0	198·0	188	− 10
182·0	247·0	255	+ 8

Single Jet. Oil Gas.

A = 1·36, c = 18.

33·1	22	20·5	− 1·5
78·5*	64	—	—
90·0	96	98·0	+ 2·0
118·0	141	136·0	− 5·0
153·0	178	184·0	+ 6·0

* This observation must be erroneous.

Argand Burner. Coal Gas.

A = 1·9, c = 84.

148	93	121	+ 28
203	260	226	− 34
241	308	300	− 8
266	332	346	+ 14
318	426	442	+ 16

Argand Burner. Oil Gas.

A = 2·7, c = 120.

173	153	142	− 11
216	241	258	+ 17
255	377	365	− 12
288	435	455	+ 20

In the Argand burners the lowest item of the series, which appears to be under the normal range, has been omitted.

The next series of experiments available are a valuable set by Mr. King, of Liverpool, published in the JOURNAL of 1851, p. 142. They were made with four kinds of burners—namely, the single jet, the fishtail, the bat's-wing, and the Argand. The experiments on the first-named class, and two of the fishtails, have not range enough for the present object, and the last of the Argands is evidently quite an exceptional thing, giving very anomalous results. The remaining experiments are as follow; the consumption being in cubic feet per hour, and the light in sperm candles:—

Fishtail, No. 2.

A = 4·31, *c* = 0·25.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
0·5	1·13	1·08	− 0·05
1·0	3·11	3·23	+ 0·12
1·5	5·25	5·40	+ 0·15
2·0	7·58	7·55	− 0·03
2·5	9·48	9·70	+ 0·22

Last observation omitted—beyond normal range.

Fishtail, No. 3.

A = 4·51, *c* = 0·25.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
0·5	1·13	1·13	0·00
1·0	3·48	3·40	− 0·08
1·5	5·79	5·65	− 0·14
2·0	8·14	7·90	− 0·24
2·5	10·17	10·20	+ 0·03
3·0	12·54	12·42	− 0·12
3·5	14·35	14·70	− 0·35

Fishtail, No. 4.

A = 4·76, *c* = 0·25.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
0·5	1·19	1·19	0·00
1·0	3·49	3·57	+ 0·08
1·5	6·00	5·95	− 0·05
2·0	8·34	8·32	− 0·02
2·5*	—	—	—
3·0	13·50	13·10	− 0·40
3·5	15·43	15·43	0·00
4·0	17·20	17·80	+ 0·60

* Erroneous observation.

Bat's-wing.

A = 4·72, *c* = 0·3.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
0·5	0·91	0·94	+ 0·03
1·0	3·01	3·32	+ 0·31
1·5	5·60	5·68	+ 0·08
2·0	8·20	8·05	− 0·15
2·5	10·30	10·40	− 0·10
3·0	12·93	12·80	− 0·13
3·5	15·05	15·15	+ 0·10
4·0	17·84	17·50	− 0·34
4·5	19·44	19·90	+ 0·56
5·0	22·00	22·25	+ 0·25

Argand, 16-hole.

A = 5·7, *c* = 1·3.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
1·5	1·53	1·14	− 0·39
2·0	3·80	3·99	+ 0·19
2·5	6·50	6·84	+ 0·34
3·0	9·81	9·70	− 0·11
3·5	13·02	12·55	− 0·47
4·0	15·36	15·40	+ 0·04
4·5	17·82	18·25	+ 0·43

Argand, 28-hole.

A = 5·66, *c* = 1·2.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
1·5	1·74	1·70	− 0·04
2·0	4·52	4·53	+ 0·01
2·5	6·77	7·38	+ 0·61
3·0	10·50	10·20	− 0·30
3·5	13·02	13·05	+ 0·02
4·0	15·36	15·85	+ 0·49
4·5	18·00	18·70	+ 0·70

In both Argands the first observation is omitted as below the normal range.

The next recorded experiments are those by MM. Audouin and Bérard, published in the JOURNAL of 1863. Those that bear on the present object are with bat's-wings, single jets, and fishtails. Argands were not tried in the mode here required. The consumption is given in cubic feet per hour:—

Bat's-wing. Slit 1-89th in. wide.

A = 16·1, and, very exceptionally, *c* = 0.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
7·45	120	120·0	0·0
6·67	110	107·5	− 2·5
6·36	100	102·0	+ 2·0
5·51	90	89·0	− 1·0
5·02	80	81·0	+ 1·0
4·38	70	70·5	+ 0·5
3·60	60	58·0	− 2·0
3·11	50	50·0	0·0
2·40	40	38·7	− 1·3
2·01	30	32·3	+ 2·3

This is the only case which appears to conform to the old assumption of the light being proportional to the consumption.

The following is on a burner with a wider slit, and it is remarkable for its great range, furnishing a most severe test of the new law:—

Bat's-wing. Slit 1-63rd in. wide.

A = 24·2, *c* = 0·7.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
9·32	200	208·0	+ 8·0
8·33	180	185·0	+ 5·0
7·35	160	161·0	+ 1·0
6·43	140	139·0	− 1·0
5·37	120	113·0	− 7·0

Bat's-wing. Slit 1-63rd in. wide.

A = 24·2, *c* = 0·7.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
4·59	100	94·0	− 6·0
3·96	80	79·0	− 1·0
3·18	60	60·0	0·0
2·65	50	47·0	− 3·0
2·33	40	39·5	− 0·5
1·52	20	20·0	0·0
0·99	10	7·3	− 2·7

Messrs. Audouin and Bérard have several experiments on single jets, but there are only two in which the burning is good and the range extended. These are as follows:—

Single Jet, 1-25th in. Diameter.

A = 0·24, *c* = 0·75.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
0·88	0·06	0·03	− 0·03
1·31	0·14	0·13	− 0·01
1·80	0·24	0·25	+ 0·01
2·33	0·38	0·38	0·00
2·83	0·51	0·50	− 0·01
3·53	0·65	0·67	+ 0·02

The first observation appears below the normal range. It is marked "flame pale."

Single Jet, 1-18th in. Diameter.

A = 0·245, *c* = 0·6.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
0·89	0·08	0·07	− 0·01
1·27	0·17	0·16	− 0·01
1·94	0·31	0·32	+ 0·01
2·40	0·43	0·44	+ 0·01
2·89	0·57	0·56	− 0·01
3·88	0·71	0·81	—

The last observation must obviously be either erroneous or quite abnormal.

The only other experiment by these authorities is the following:—

Fishtail Burner.

A = 30, *c* = 0·8.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
1·31	20	15	− 5
2·30	50	45	− 5
3·88	86	92	+ 6
4·94	122	124	+ 2
6·18	170	161	− 9
7·42	190	199	+ 9

In the work of M. E. R. D'Hurcourt, "De l'Eclairage au Gaz," published at Paris in 1863, the author gives a few experiments of the kind now under consideration. It will suffice to extract the two following; the consumption is in litres per hour:—

Single Jet (best), 75 Millimètres Diameter.

A = ·0415, *c* = 0·9.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
8·0	0·06	—	[Abnormal.
15·0	0·25	0·25	0·00
21·5	0·53	0·52	− 0·01
28·0	0·74	0·79	+ 0·05
35·0	1·07	1·08	+ 0·01
47·0	1·57	1·57	0·00
51·0	2·01	1·74	Abnormal.

Argand.

A = 0·2, *c* = 60.

Consumption = *q*.	Light = L. As Recorded.	As Calculated by Proposed Law.	Difference.
82	4·35	4·40	+ 0·05
100	8·70	8·00	− 0·70
114	11·11	10·80	− 0·31
124	13·33	12·80	− 0·53
128	16·00	13·60	Abnormal.

We now come to the experiments quoted by Professor Silliman in support of the Farmer theorem, and which, when examined, will be found to accord very much better with the new law. Those which consist of a small number of observations must be passed over, as they are inconclusive for any law; but he has quoted two sets of four observations each, which (though even this range is too small) admit of comparative trial. They are as follows; consumption in cubic feet per hour:—

Experiment 2.—Standard Argand Burner.

Here, by the new law, A = 1·3, *c* = 2·6.

Consumption.	Light Recorded.	Light Calculated. By Farmer's Theorem.	Difference.	By the New Law.	Difference.
3·30	1·00	1·00	—	0·91	− 0·09
4·35	2·10	1·73	− 0·37	2·28	+ 0·18
5·13	3·20	2·41	− 0·79	3·30	+ 0·10
5·55	4·00	2·82	− 1·18	3·85	− 0·15

Experiment 3.—Another Argand Burner.

Here A = 0·846, *c* = 2·5.

3·72	1·00	1·00	—	1·03	+ 0·03
4·88	2·00	1·71	− 0·29	2·01	+ 0·01
6·00	3·00	2·60	− 0·40	2·96	− 0·04
7·22	4·00	3·77	− 0·23	4·00	0·00

On page 158 of the JOURNAL OF GAS LIGHTING for this year, Mr. Charles Hunt gives some experiments to show the inapplicability of Farmer's theorem; but they have no great range, and he has supplemented them by three more extended ones, on page 440. Mr. Hunt's is a valuable contribution to the philosophy of burners; and his experiments, when tested by the geometrical method, bear every stamp of care and correctness. The author infers from them that the irregularity of the results is "so marked that no theorem accounting for the ratio can be built upon them." He attributes this irregularity to the effect of the chimney, and expresses his belief that if this source of anomaly were eliminated, the old assumption of the proportionality of light to quantity would apply. In this opinion I think he goes too far. No doubt the chimney of an Argand burner has an important influence on the ratio in question, and the nature of this influence requires careful study; but in the meantime universal experience with naked flames, as well as with glazed ones, makes it clear that the law of simple proportion is not the true one. Moreover, it may be shown that, taking Mr. Hunt's experiments as they are, they are not so irregular as he thinks they are, seeing that in the great part of their range they in every instance conform, within small limits of error, to the new law now proposed.

They are as follows; the consumption is in cubic feet per hour, and the light in standard sperm candles:—

London Argand, 6-in. Chimney.

In this case A = 6, $c = 2{\cdot}5$.

Consumption = q.	Light = L. As Recorded.	Light = L. As Calculated by Proposed Law.	Difference.
5·96	19·39	—	Above normal range.
5·53	17·14	—	
5·21	15·91	16·26	+ 0·35
4·99	14·94	14·94	0·00
4·58	13·36	13·48	+ 0·12
3·99	8·98	8·94	− 0·04
3·53	6·12	6·18	+ 0·06
3·03	3·28	3·18	− 0·10
2·47	1·37	—	Below normal range.
2·00	0·47	—	

Bengel Argand, 8-in. Chimney.

A = 4·9, $c = 1{\cdot}75$.

5·25	15·79	—	Abnormal.
4·49	13·25	13·40	+ 0·15
4·05	11·44	11·25	− 0·19
3·54	8·72	8·82	+ 0·10
3·07	6·27	6·46	+ 0·19
2·58	4·00	4·07	+ 0·07
2·15	2·46	—	Abnormal.
1·71	1·04	—	
1·54	0·66	—	

15-hole Standard Argand, 7-in. Chimney.

A = 4·3, $c = 1{\cdot}75$.

5·90	17·54	17·80	+ 0·26
5·58	16·46	16·50	+ 0·04
4·87	13·41	13·40	− 0·01
3·92	9·55	9·35	− 0·20
3·41	7·57	7·15	− 0·42
2·72	3·93	4·18	+ 0·25
1·71	0·95	—	Abnormal.
1·48	0·49	—	

Some apology is necessary for carrying the demonstrations to such a length. The new law might probably have been proved more easily, and more completely, by direct experiments; but the proof is more conclusive when effected by the more laborious process of basing it upon data already existing, and the independence of which is therefore beyond question.

The results will speak for themselves, the degree of correspondence under such a great variety of trials being such as could hardly be attributable to anything but a real accordance of the law with the facts observed. This accordance is further shown, not only by the smallness of the differences, but by their *irregularity*. If the true law were materially different from the one here assumed, the position (to revert to the geometrical test) of the experimental points would differ from the assumed straight line in some regular way, the general tendency of which, in multiplied cases, might easily be traced; as it is, the departures from it are so capricious and void of order, as well as so small, as to point clearly to mere irregularities of observation, which must, to a certain extent, exist in the best-conducted experiments. The only trace of a regular variation is in some of the Argands, and this is, no doubt, as Mr. Hunt suggests, due to the action of the chimney.

Supposing, therefore, the law to be a correct expression of the relation referred to, the next step towards making it practically useful would be to investigate, by careful and systematic experiments, how the constants in the formula are affected by the circumstances of the combustion, such as the quality of the gas, the pressure, the nature and dimensions of the burner, the use of the chimney, and so on.

It would further be desirable (as has been suggested by an eminent authority) to ascertain the extent of the "normal range" for every kind of burner. When the supply of gas is too small, the normal action is not reached; when too large, or given under too great a pressure, the normal action is exceeded; and in either of these cases the burner is of course used at a disadvantage. In bad burners this range may be very small; in good ones it will be large, and no doubt the conditions that govern it may easily be discovered.

If these points were determined, and the new formula were properly adapted to them, it would probably furnish a means of testing the economical and photometric values of different varieties of gas-burners far more completely and satisfactorily than by the vague estimations hitherto applied. P.

Correspondence.

GAS FIRES.

SIR,—I am very glad to see our esteemed friend, Mr. Rutter, in print again. Just a word to supplement his able remarks on gas fires in your last impression.

I beg to say that I had in this town last winter twelve gas fires going, and have this season already added six to their number. Taking the comparative cost of a gas and a coal fire burning hour by hour, the coal fire will, no doubt, be found cheaper than gas; but if the comparison is extended for an entire year, and the gas used with judicious economy, and not left too much to under-servants, I apprehend there will not be much difference in cost, for this reason—that during the spring and fall of the year there are a great number of days during which a fire is required but for an hour or two daily. Now, if a coal fire is used, it must be kept burning all day for the sake of the short time morning and evening when it is necessary. A gas fire can be lighted ten minutes before the room is required, and, when wanted, there is, if the fire is properly constructed, a grate full of incandescent material, which can be extinguished at will; and here is its great advantage—the expense ceases at once. They can be applied to many cases where apartments are only occasionally used—as dressing-rooms, surgeons waiting-rooms, the drawing-room for an hour's music in the evening, &c. Those constructed on my principle will burn for, say, the first ten minutes or quarter of an hour after lighting, at the rate of 30 cubic feet per hour; after that the gas may be turned down to 12 or 15 feet per hour, at which they will keep their bright cheerful appearance, and diffuse warmth throughout the apartment, maintaining the temperature at 65° to 70° Fahr. This, as you will perceive, is not very expensive, as my gas is now 4s. 2d. per 1000 cubic feet. I tell my customers about a penny per hour, and with that they are quite satisfied. My burner certainly is not constructed in the same manner as Mr. Rutter's, nor do I use pumice stone, but a material manufactured on these premises, and which, though dearer at first than pumice, answers so much better that cost is not considered, and is, according to one year's experience, indestructible. One fire I just think of has been laid more than thirteen months, and, though subject to frequent and rough usage, no diminution of bulk is apparent, and certainly none of utility. No fire-laying, no wood smoke, no dust, no smell.

All persons will acknowledge the benefits of gas as an artificial source of light; but I think, sir, the public are not made sufficiently acquainted with the many purposes to which gas as a heating agent may be applied. The tailor, the laundress, the hairdresser, the eating-house, &c., &c., all require heat, and can, I contend, obtain it as economically from gas as from any other source. The facilities with which its advantages may be adapted only require to be intelligently explained to make them popularly appreciated. Undoubtedly, the proper person to do this is the officer of the gas company; if it is left to tradesmen in country towns (who are seldom conversant with such matters) to make the required apparatus, something will be erected which will not attain the object promised, probably be very expensive, not effective, and in nine cases out of ten produce a most filthy stench, so that the consumer says, "If this is your heating by gas, I'll have no more on't;" and a prejudice is excited in his mind which, perhaps, will take years to eradicate.

I strongly recommend managers of small provincial companies to take the matter in hand themselves, and to let gas-stoves, for heating and cooking, on hire at a nominal rental sufficient to pay interest on capital invested and to pay for repairs. I am sure, if this suggestion is followed, the consumption will largely increase, and that of course will ultimately tend to the consumer's benefit in a reduction in price.

I know the idea is not new, but is practised with great success by many companies; however, its advantages cannot be too widely diffused, and that, sir, is my apology for requesting the insertion of this in your valuable JOURNAL. WILLIAM WRIGHT.

Gas-Works, Lewes, Oct. 29, 1870.

SIR,—I have read with some degree of pleasure the communication of Mr. Rutter on gas fires, especially as I have taken considerable trouble in furthering their use among consumers.

I have fitted several with perfect success, but have unexceptionably found lump asbestos very superior to pumice, as recommended by Mr. Rutter.

I at first found great difficulty in procuring the asbestos large enough; it could only be bought in a small fibrous condition. This I found, on experiment, easily remedied by combining it with moist Stourbridge clay, drying it off, and then using it. In this condition it is quite equal to natural lump asbestos, and very superior to pumice.

The mode in which I mix it is very simple. Place some Stourbridge clay in a suitable vessel (say a pail), mix it with water to a pasty consistency, and then keep adding the small fibrous asbestos as you mix, until it will take no more, getting at the end as much asbestos to as little clay as will thoroughly combine. Then take out small portions about the size of hens eggs, squeeze them in the hand into the most awkward and jagged shape you can, and put them in a warm place to dry (I generally lay them on a tin, and place them on my boiler-beds). They are then ready for use as recommended for pumice, but much superior.

I can say nothing in favour of the economy of the gas fire, but the efficiency of the one I here recommend is beyond dispute, and the advantage is that you can have a bright fire at a few minutes notice, and dispense with it still more readily. A. H. WOOD.

Gas-Works, Hastings, Oct. 28, 1870.

THE METROPOLITAN GAS ACCOUNTS.

SIR,—The accounts of the several London companies now published in the form issued by the Board of Trade are of a more uniform character than any that have hitherto appeared in your JOURNAL, and from them *some* comparison may be made with the working and results of the respective companies. Although the secretaries and engineers of these companies are thoroughly indifferent to and beyond *any* comparisons, and directors generally are content while the 10 per cent. is secured, it may be worthy the attention of some of your readers to ascertain the different results, and to see what can be made from such documents. Under the head of "Profits," I think the following rough calculations will not be far short of the truth.

Profits.

	Per Ton of Coals.	Per 20s. charged for Coals.	Per 20s. of Rental.	Per Ct. on Rental.	Per Ct. on Capital.
City Company	·654 of £1	·795 of £1	·356 of £1	35·58	8·56
Chartered	·479 „	·5 „	·266 „	26·61	5·72
Imperial	·666 „	·825 „	·388 „	38·48	10·58
South Metropolitan	·861 „	1·177 „	·461 „	46·18	18·57
Commercial	·657 „	·857 „	·393 „	39·28	12·11
Equitable	·850 „	1·009 „	·447 „	44·74	12·67
Independent	„	·768 „	·363 „	36·33	13·61
London	·616 „	·826 „	·364 „	36·51	8·07
Phœnix	·778 „	1·096 „	·458 „	45·83	9·54
Ratcliff	·355 „	·508 „	·228 „	22·83	6·02
Surrey Consumers	·608 „	·814 „	·4 „	40·04	9·55
Western	·726 „	·629 „	·308 „	30·78	9·71

As the fourth and fifth columns of this table differ from the calculation in your last publication, I think I should state, in explanation, that, in order to make a fair comparison (the object, I imagine, of your calculations), the rental and profits of all the companies should be worked out, as nearly as can be, on the basis of an uniform charge; and, therefore, I have reduced the Phœnix 4s. 3d., and the Ratcliff 4s. 6d., to 4s.; and I have raised the Independent 3s. 4d., and the South Metropolitan 3s. 2d. and 3s. 4d., to 4s.; the 5s. 6d. "mixed" I have considered as equivalent to 4s. common gas. In addition to these corrections, I have further assimilated the profits by striking out, both from the debit and credit sides of some of the accounts, items which are peculiar to some companies and not others, such as charges for gas referees, pensions, &c., and receipts for meters.

Under the head "Products," I have endeavoured to ascertain the per centage of fuel and receipts for coke. To do this I have assumed that *all* the coals yield 36 bushels of coke, *and no more*, and that every chaldron sold consists of the same quantity, *and no more*. With this data, and considering that some coals yield more and others less, I think it will be admitted that, on the whole, there is not much occasion for one to boast of doing better than another. The two exceptional cases of the Phœnix and Ratcliff will be found, on further inquiry, to *result in the same money value;* for as the Phœnix receive for their coke so much less per chaldron than the adjoining company, they in reality derive no benefit from working at 16 per cent. fuel, even if such is the fact, which I much doubt. The Ratcliff receive a larger amount per chaldron than their opposite neighbour, but counterbalance the difference by consuming more fuel.

	Fuel and Tar.	Price.
Imperial	27·3	6s. 5d.
South Metropolitan	31·3	8 5
Commercial	35·1	7 7
Equitable	31·4	8 0
London	28·5	7 10
Phœnix	16·0	7 0
Ratcliff	39·0	9 4
Surrey Consumers	29·3	8 0

The apparent differences between the years 1868 and 1869, in the third and fourth tables in the last JOURNAL, arise from many items being appropriated under other headings.

By inserting these remarks you will oblige

NO NOVICE AT FIGURES.

Legal Intelligence.

GUILDHALL POLICE COURT.—TUESDAY, NOV. 1.

(*Before Alderman Sir* R. W. CARDEN.)

THE GASLIGHT AND COKE COMPANY *v.* ROBINSON.

The defendant, *Charles Norman Robinson*, residing at No. 5, Princes Street, Barbican, appeared to two summonses taken out by the Gaslight and Coke Company for unlawfully disconnecting the meter on his premises without giving the company 24 hours notice in writing, and also for injuring the meter.

Mr. BESLEY, who appeared for the gas company, said the summonses had been taken out by the complainants, for the purpose of letting the public know the penalties they incurred and the danger they ran in interfering with the gas-meters. The Act of Parliament imposed a penalty of £5 on any one disconnecting a meter without giving notice, and it was most important that that should be known to the public, because great fires and serious accidents had occurred, involving the sacrifice of enormous amounts of property, both to the company and the public, by such improper interference with the company's pipes. It was to that cause that the great fire at Saville House was attributed, which caused the destruction of such a large amount of property, and caused so much litigation afterwards. The defendant, without giving notice to the company, disconnected the pipe from the meter, causing an explosion so severe that he was blown down and very much injured, and his property also received considerable damage. The defendant had expressed his regret to the company for the impropriety he had been guilty of, and had made every reparation in his power. Nevertheless, the company felt it was necessary for the safety of the public that the case should be brought before the court. Under all the circumstances, and considering the injuries Mr. Robinson had received, the company did not ask for more than a nominal penalty.

Sir R. W. CARDEN asked the defendant if he had anything to say to the complaint.

Mr. *Robinson* said that he had only to express his gratitude to the company for instructing their counsel to say so much in his behalf.

Sir R. W. CARDEN asked him if he was aware that he was infringing the Act of Parliament.

Mr. *Robinson* said he was not. All he wanted to do was to blow through the pipes and connect them again.

Sir R. W. CARDEN asked him whether he was aware now that he had done wrong and incurred great danger.

Mr. *Robinson* said he was, but what he had done was done in ignorance.

Sir R. W. CARDEN said it was a very important provision in the Act of Parliament, and the penalties under it should be rigidly enforced; but as the company only asked for a nominal penalty, he should fine the defendant 5*s.* and costs, and he hoped that it would be a caution to him for the future.

Mr. *Robinson* said it would.

Mr. BESLEY said the company would not press the second summons. It was accordingly withdrawn.

Miscellaneous News.

CONTINENTAL UNION GAS COMPANY, LIMITED.

The Ordinary General Meeting of the Shareholders of this Company was held at the Terminus Hotel, Cannon Street, London, on Tuesday, Oct. 25.—LEWIS CUBITT, Esq., in the chair.

The SECRETARY (Mr. R. J. Fennessy) read the accounts and the following report:—

Your directors have the pleasure of presenting their report and the accounts for the year ending the 30th of June last.

It is with much satisfaction that they are able to announce that the increase in the revenue and profits of the company, which manifested itself in so marked a degree in the year ending the 30th of June, 1869, has continued during the past year; that a steady progress has been maintained, and that the benefits arising from the expenditure that has been made at the various stations, in improving and enlarging the works, can be clearly recognized.

The increase has been especially satisfactory in most of the larger stations—viz., Genoa, Strasburg, and Nismes—while at Milan there has been a slight, but it is believed transient check, caused by a reduction in the price of gas, dating from the 1st of January last.

During the year the private lights have increased from 109,271 to 116,529, and the public from 12,840 to 14,780.

During the past year the following are the principal works of extension and improvement that have been carried out, viz.:—

At *Milan*, two new batteries of through and through retorts, and the continuation of the enlargement of mains.

Genoa.—New telescopic gasholder in existing tank, and general improvements in mains and works.

Nismes.—Renewal of retort-house, extension of mains and apparatus generally.

Strasburg.—Renewal of retort-house, additional telescopic gasholder, and enlargement of mains.

Parma.—Additional gasholder.

Modena.—Additional gasholder, and sundry enlargements required by renewal of concession.

Rueil.—Renewal of gasholder, erection of exhauster, and purchase of land by river side for erection of new gasholder for Chatou district.

Vienne.—Exhauster.

Messina.—Exhauster, new retort settings and chimney.

Since the closing of the books on the 30th of June, an event of such importance has occurred, that, although it has had no direct influence upon the accounts before you, and has not fallen within the period now under review, it cannot on this occasion be passed over in silence.

On the 15th of July war was declared by France against Germany, and one of the principal places lighted by this company, the fortified town of Strasburg, has been besieged, captured, and occupied by the German troops.

Immediately on the news of the capitulation, your directors despatched their engineer to the spot, to report upon the extent of the damage, and upon the repairs that would be required.

From the accounts since received, the injury to the works has been very great; the gasholders, purifiers, and roofs have been much damaged, and the chimney destroyed by the bombardment.

Active steps are being taken to reinstate the machinery, with a view of resuming the lighting of the town at the earliest possible period. Fortunately the benches of retorts are not much hurt; the mains throughout the city there is reason to hope are not much injured, and the important quarters of the town, from which the company derives its greatest revenue, have escaped the destruction which has fallen on the poorer suburbs. The cost of the repairs rendered necessary by the effects of war will be reimbursed to the company. It is expected that in the course of a few weeks the works will again partially resume their operations, which are most urgently demanded by the municipality and the German authorities.

There is apparently no immediate danger, or even probability that the company's works at other stations in France will be injured. Montargis and Rueil are in the vicinity of the invading army, and may have been occupied by the Prussians; but as all the others except Strasburg are unfortified towns, there is no reason to anticipate that any damage will accrue to them.

From the general interruption to trade and to the ordinary pursuits of industry which must be the consequence of this unfortunate war, France cannot fail to suffer, and, in common with this national misfortune, a diminution in the profits of the French stations must be expected during the current year; but it must be borne in mind that a larger portion of the company's revenue is derived from the Italian stations.

Under the present aspects of affairs, the board have determined not to divide, for the half year ending the 30th of June, more than they paid as the interim dividend on the 4th of May—viz., 4 per cent., making 8 per cent. for the year.

The balance of undivided profits to the 30th of June, including that carried forward from last half year, after providing for sinking-fund, paying the interim dividend and the interest on debentures, and dividend on preference shares, is £34,730 7*s.* 3*d.*, and after distributing 4 per cent. for the second half year, or 8 per cent. for the whole, there will remain a balance to the credit of the revenue of £16,897 0*s.* 7*d.*, to be carried forward to meet any contingency which may arise in the usual course, or from such an unexpected calamity as the present war. The dividends will be paid on the 4th of November.

The retiring director is H. W. Blake, Esq., who being eligible for re-election, offers himself accordingly.

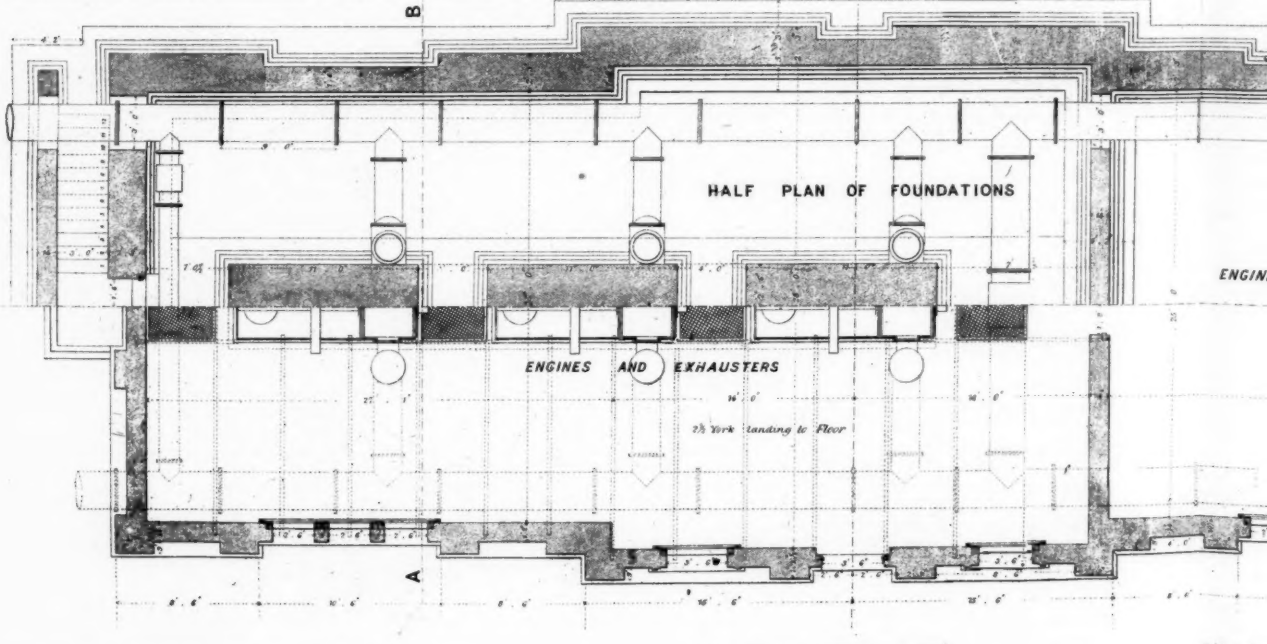
The CHAIRMAN: Gentlemen, we have endeavoured, in the report just read, and in the accounts laid upon the table, to present you with all the details we consider necessary in reference to the working of the company during the past year, and we have also shown you the amount of capital invested in the concern, with the various additions made from time to time. The profits, unfortunately, are not quite so large as I ventured to predict they would be when we last met you in this room. Still they are very near it, but we think it will not be prudent to divide more than 4 per cent. for the half year, making the dividend for the whole year 8 per cent. Trade in France generally has, of course, been much depressed by the unfortunate circumstances to which the report refers, and by what *The Times* aptly described as "the six weeks tragedy at Strasburg." Other places have suffered also. At Strasburg we are losing the profits made for some time, but the Germans are very ardent, and have ordered us to restore the public lighting with the least possible delay. They have also lent us troops of men to assist us in getting our working operations into order at the first practicable moment. We are working hard at the necessary repairs, and have entered into a contract with an English firm of good repute to put up a new gasholder, and we trust confidently that in a month or six weeks some portion of the lighting will be recommenced, and that the further progress of the works will continue until we reach the full pitch of our operations again. It is supposed that the lighting will go on largely, for the best part of the town is not much injured. The chief damage has been sustained in the poorer parts, where we had very little lighting. The Germans are, as I said before, very ardent to get the thing again into working trim as soon as possible; and as soon as we get to rights I hope and believe our consumption will speedily be equal to what it was before. Other places, as we state in our report, may

EXHAUSTER HOUSE

CHARTERED GAS
BECKTON WO

LONGITUDINAL SECTION LOOKING FRONT.

FRONT ELEVATIO



HALF PLAN ABOVE PLINTH

Scale of

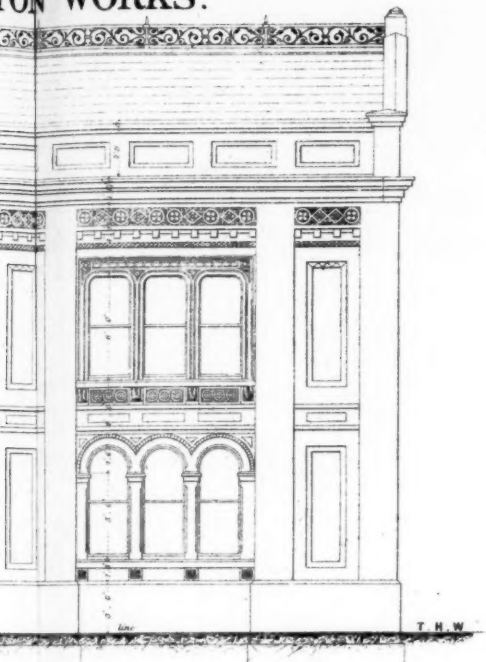
Note... *There are no Windows in the back of the Building, & no Terra-cotta dressings; but the brickwork will be panelled out the same as front.*

Photo-Lithographed by Whiteman & Bass Li

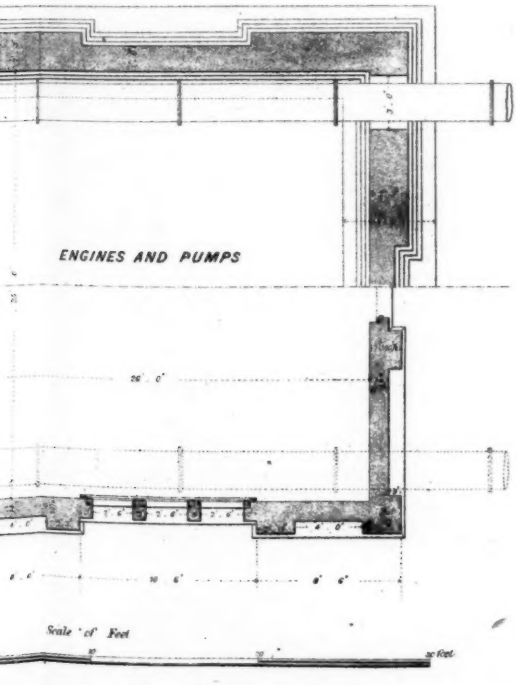
) GAS COMPANY.

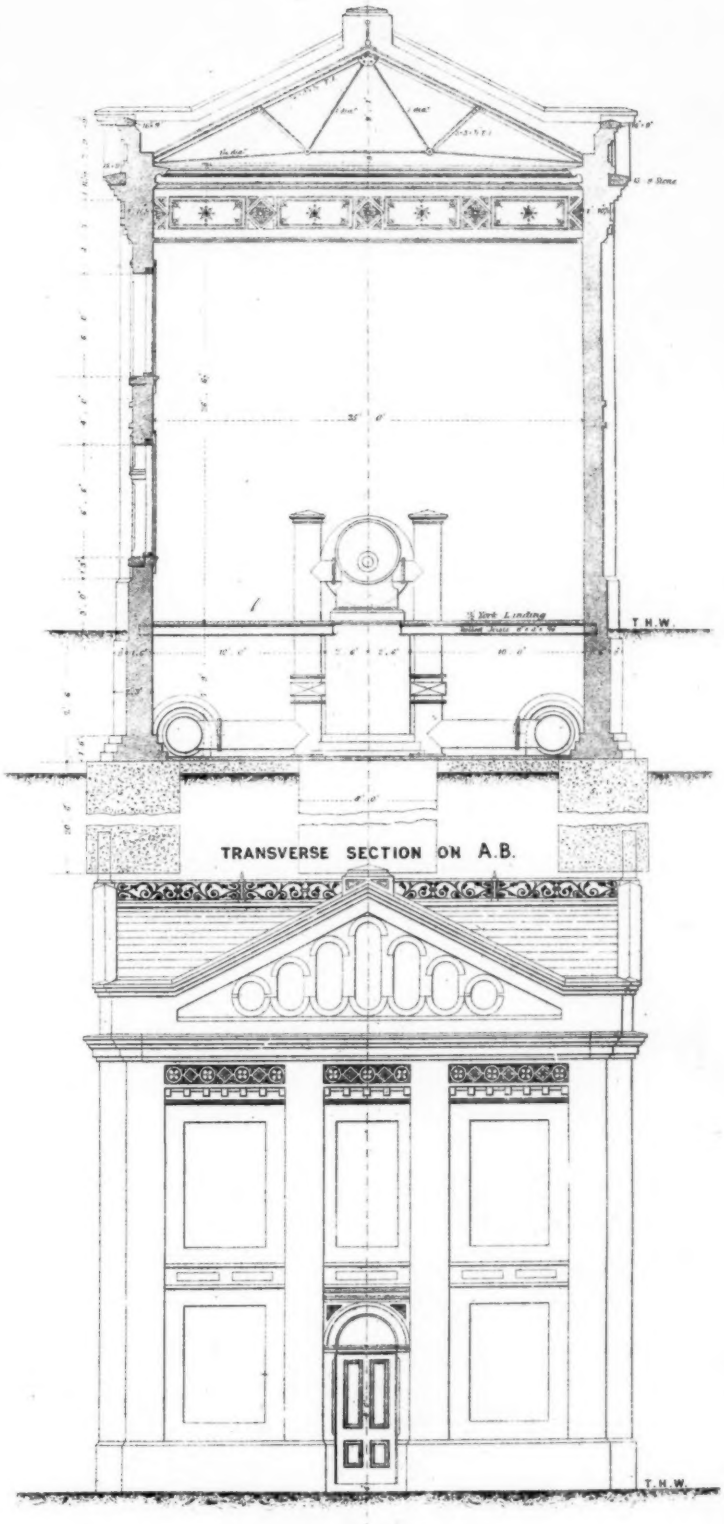
TON WORKS.

Nº11



NT ELEVATION





TRANSVERSE SECTION ON A.B.

END ELEVATION

Whiteman & Bass London

be affected by the progress of the war, such as Montargis and Rueil; but we do not at present know what may take place, for really our correspondence has been so cramped and so difficult to be maintained that we hear very little of these places, except through the newspapers. Montargis is near to a railway, and there has been a great deal of movement in that direction, but we have not learnt that any injury has been done to our works. Rueil is near to Malmaison, and in the vicinity of one of the large forts surrounding Paris. That fort is Mont Valérien, which the French have used to their own great spoliation, in the destruction of the Palace of St. Cloud; but we do not hear that they have done us much injury. Ours is not a very large affair there, although Rueil is a suburb in which there is a considerable amount of lighting. As other places in the neighbourhood had begun to light, we had put up a gasholder at Chatou to increase our ability to meet the demand. We think as it is not a fortified place, and the Germans do not do mischief for mischief's sake, we may hope that here, as well as at Montargis, we may escape pretty freely. During the past year exchanges have been favourable to us; the cost of coal has also been favourable; freights, too, have been favourable, and we had hoped that in the march of prosperity we should be able to give you a better report than we have done. Still, under all the circumstances, I think it is pretty fair and passable. I do not know that I have anything further to say, but if any gentleman desires additional information respecting our undertaking I shall be happy to give him all the information in my power. I move—"That the report and accounts now read be received and adopted."

Mr. FAWCETT seconded the motion.

Mr. RICHARDS: The report states that the cost of repairing the injury done to our property will be reimbursed to us. May I ask to what benevolent individual we shall be indebted for that happy state of things?

Mr. SHAW (a director): May I venture to suggest that it is not a question which it is desirable to answer?

Mr. RICHARDS: Then I withdraw it at once.

The CHAIRMAN: I may state that the authorities have desired to have a statement of the loss sustained at the works, which has been done, and we hope and trust that our proprietors will sustain no further loss than the loss of business during this unfortunate calamity.

The motion was put, and carried unanimously.

The CHAIRMAN: I have now to move—"That Henry Wollaston Blake, Esq., be re-elected a director." He has been with us from the beginning of the undertaking; he is a most eligible member of the board, and he has exerted himself very beneficially for the concern. With this conviction I propose his re-election with great confidence.

Mr. SHAW: I beg to second the proposition. I have sat with Mr. Blake as long as I have had a seat at the board, and I know that no man could be more energetic and useful than he is.

The motion was unanimously adopted.

Mr. BLANFORD moved, and Mr. PEILL seconded, the re-election of Mr. Hadland and Mr. Backler as auditors for the current year, which was put, and agreed to.

Mr. STOKES: We must all feel very gratified that, under the circumstances in which they have been placed, the directors are able to present so favourable a report to us on this occasion, and to give us a dividend of 4 per cent. We are much indebted to them for the care they have bestowed on our interests, and I have great pleasure in moving a cordial vote of thanks to them.

Mr. RICHARDS seconded the motion, which was heartily responded to.

The CHAIRMAN acknowledged the vote, and the proceedings terminated.

CEARA GAS COMPANY, LIMITED.

The Ordinary General Meeting of the Shareholders of this Company was held at the Offices, 15, Coleman Street, London, on Friday, Oct. 28—Colonel A. A. CROLL, in the chair.

The SECRETARY (Mr. Guyatt) read the following report:—

The directors have much pleasure in presenting to the shareholders the accompanying accounts, showing the position of the company at the 30th of June, 1870.

By these documents it will be seen that since the last meeting the sum of £889 10s. has been expended on capital account, necessitated by the increase in the consumers of gas.

The rental for gas exhibits a steady increase, and, but for the war in Paraguay, no doubt the increase would have been still greater.

Since the commencement of the present year, a new manager has been sent out to Ceará. He took charge of the works on the 1st of April, and during the three months ending Sept. 30 considerable improvement has taken place in the carbonizing department.

The additional cost incurred in making this change, and other circumstances, prevents the directors at this time increasing the dividend beyond 8 per cent. per annum, and they trust the shareholders will consider this, under the exceptional circumstances referred to, satisfactory.

The cost of collection and the commissions paid to the financial agents at Ceará presses heavily upon the profits of the company, but it is hoped that for the future an improvement in this direction will be effected.

The directors regret to announce the decease, in April last, of Mr. Brandt, the secretary of the company. Mr. Brandt's services in connexion with the company are so well known to the shareholders—more especially to those in Ceará—that the directors feel sure the shareholders will join in their regret at the loss of his valuable services.

The directors who retire at this meeting are Dr. Fraser and Mr. Schenley, who, being eligible, offer themselves for re-election.

Mr. Arthur J. King, the auditor of the company, also retires from office, and, being eligible, offers himself for re-election.

Balance-Sheet, June 30, 1870.

Dr.				*Cr.*			
To Capital paid up, viz.:—				By Investment—			
2840 shares, of £10 each			£28,400 0 0	As per balance-sheet, Dec. 31, 1868		£26,070 2 3	
Debentures issued			400 0 0	Additional since that date, on plant and buildings	£716 16 10		
Amounts due by the company			2,884 3 4	Meters	172 13 2		
Dividends unpaid			281 4 0		889 10 0		
Revenue account—							£26,959 12 3
Balance unappropriated, December, 1868	£1,532 0 7			Stock of materials, gas-fittings, coals, and meters at Ceará			2,918 19 6
Net profit for the eighteen months ending June 30, 1870	3,229 12 4			Amounts due to the company for public and private lighting, gas-fittings, and products			1,808 2 10
	4,761 12 11			Sundry balances			508 4 7
Less dividends declared—				Office furniture in London and at Ceará			155 5 6
On June 4, 1869, at 5 per cent. for the half year	£1,377 7 4			Cash at bankers			775 8 8
On Nov. 5, 1869, at 4 per cent. for the half year	1,112 0 0						
On June 3, 1870, at 4 per cent. for the half year	1,112 0 0						
		3,601 7 4					
Leaving unappropriated			1,160 5 7				
			£33,125 12 11				£33,125 12 11

Revenue Account, for the Eighteen Months ending June 30, 1870.

Dr.		*Cr.*	
To Coals carbonized	£3,151 1 9	By Gas supplied to public lights	£8,232 16 1
Manufactory	864 8 5	Private consumers	3,047 0 1
Public lighting expenses and fines	637 17 9	Residual products	235 13 8
Maintenance	329 2 8	Profit on gas-fittings	242 16 6
Salaries	1,292 14 8	Exchange account	367 14 4
Rent and taxes	276 19 6		
Commission at Ceará	506 18 5		
Interest at ditto	348 4 2		
Ditto in London	119 2 3		
Auditors fees	10 10 0		
Directors ditto	600 0 0		
Charges, travelling expenses, office ditto, and sundries	566 13 4		
Interest on debentures	88 0 3		
Income-tax	104 15 2		
	8,896 8 4		
Net profit	3,229 12 4		
	£12,126 0 8		£12,126 0 8

The CHAIRMAN, in moving the adoption of the report, said there were two points to which he wished to call special attention. The first was the appointment of a new manager in the room of Mr. Compton, who had resigned. Since Mr. Anderson had succeeded to the management of affairs at Ceará, there had been, in consequence of the alterations introduced, and the great care and attention devoted by him to the interests of the company, a considerable improvement in the manufacture of gas, and a great increase in the quantity produced per ton of coal. The new arrangements for the conduct of the works had also resulted in a considerable saving in wages, and although the accounts now presented did not exhibit any of those results, they would be shown in the accounts for the current year. The other matter to which he desired to call attention was the question of the cost of collection and commissions paid to the financial agent at Ceará. For a small company like this those charges pressed seriously upon their resources. When Mr. Anderson went out to take charge of the works, he thought he could accomplish all that the financial agent did, and, of course, the directors felt desirous that he should do so. But, like a prudent man, Mr. Anderson resolved to wait until he became thoroughly acquainted with the locality, and had acquired something like familiarity with the language of the natives. The directors expected that in the course of a few months he would have made arrangements, with the concurrence of the financial agent (who was himself a large shareholder, and a man of great influence) to take the collection entirely into his own hands, which would effect a considerable saving to the company. The only other point to which it was needful to refer was the increased necessity which existed for providing facilities for unloading coals. At Ceará there was a flat beach, and a fall of tide not more than about 4 feet, he believed; the consequence was that barges could not get within a considerable distance of the shore. The present arrangements for landing were not only very bad and expensive in themselves, but such as led to great waste and injury to the coal. If the company had a jetty it would afford great facilities for, and would effect great economies in landing coal; and there were in Ceará merchants who would gladly pay a heavy toll to be allowed to use that jetty for their own purposes. Mr. Schenley, one of the directors, had laid upon the table a plan for a jetty, which the board intended to send out to Ceará by next mail, and endeavour to ascertain what help towards its erection they could calculate upon from the mercantile community there, so as to be in a position to judge whether it would be well for them to undertake the work.

Lord A. S. CHURCHILL seconded the motion, which was put, and carried unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 8 per cent. per annum, free of income-tax, be now declared, payable on the 8th of November next."

Mr. SCHENLEY seconded the motion, which was put and carried.

Dr. Fraser and Mr. Schenley were re-elected directors, and Mr. A. J. King auditor of the company.

On the motion of Mr. MORRISON, thanks were voted to the directors, and the CHAIRMAN having acknowledged the same, the proceedings terminated.

SINGAPORE GAS COMPANY, LIMITED.

An Extraordinary General Meeting of the Shareholders of this Company was held at the London Tavern, on Tuesday, Oct. 25—H. P. STEPHENSON, Esq., in the chair.

The SECRETARY (Mr. Robert King) read the notice convening the meeting, and the following report and statements of account were presented.

The directors have the satisfaction of reporting continued progress in the lighting of Singapore, for particulars of which they refer to the report annexed, from their engineer and manager, Mr. E. J. Wells, dated Oct. 14, 1870.

The balance-sheet to June 30, 1870, and appended to this report, shows the financial position of the company. The profits for the half year are £1564 18s. 5d., after writing off for depreciation of works and plant, and off the expenses of first establishment, as per balance-sheet, at the rate of 1 per cent. per annum, and £10 off office furniture, which, together with £240 0s. 1d., the unappropriated profit of the preceding half year, makes the available balance £1804 18s. 6d. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum, less income-tax, on the preference capital, and a dividend at the rate of 7 per cent. per annum on the amounts paid up on the original capital, free from income-tax; the balance of £207 17s. to be carried forward to the profit of the succeeding half year. The dividend to be payable on the 30th of November next.

The report of the engineer and manager (Mr. Wells) was as follows:—

"Gentlemen,—I had anticipated having the pleasure of meeting you again at the next half-yearly meeting, previous to my departure for Singapore. Advices that have reached me from the East have rendered it necessary that I should return as soon as possible, and

believing it to be for the interest of the directors and shareholders that I should be at my post, I have taken my passage, and leave Southampton to-morrow, the 15th inst., and hope to be in Singapore on the 25th of November.

"The report that I have again to place before you, for the half year ending June 30, 1870, upon the whole I consider satisfactory, if we take into consideration the state of trade in the East, in consequence of the present state of affairs on the Continent. The increase in the rental has not been so much as I could have wished, but it still shows that we are progressing; the increase upon the half year is 215 dols. 13 cents. The accounts have all been fully prepared as usual. I do not consider it necessary for me to go further into details and figures, as the several balance-sheets have all been carefully carried out under their proper headings.

"Since I have been in England I have succeeded in chartering a ship, at a reasonable rate, to load in Australia, and to arrive in Singapore about January next, with a cargo of Australian coal. I have also been trying to take up other ships.

"The two benches of retorts mentioned in my last have been let down, and, as they have been at work from 1864, I have decided to reset them with clay retorts, of which there were sufficient in stock. Referring to the general fitting department, the General Hospital has been lighted, and three public lamps on that line of road, and during the half year the fitters have been fully employed. From the advices dated the 25th of August, the fitters were busy with the Chinese illuminations.

"The work to be carried out as soon as possible is the lighting of Bencoolen Street and Stamford Road with 10 public lamps; sufficient mains are also sent out for Princess Street, where the public lighting is ordered. Mains are also on the way for Paterson's Road and the top of Grange Road, which will be laid as soon as possible, to enable the Europeans in that locality to use gas. Estimates have also been sent in for lighting all the police-stations and several private houses. The process of purification still continues to work well, and the illuminating power has been maintained throughout the half year. The engineer's half-yearly report will furnish you with all the details in the carbonizing department. From late advices, the plant, works, and apparatus are stated to be in good repair.

"Considering the tightness of money in the East, I consider the collection of the rental to have been satisfactory. The rates of exchange have been favourable. We have made a profit of 123 dols. 33 cents, or £27 15s. on the £4150 15s. 6d. remitted to the directors during the half year. The corrected returns in the lighting department show that we have 612 houses lighted with 7346 lights; stoves, 35; private lamps, 38; public lamps, 364; and contract lamps, 11.

"I have to apologize for the shortness of my report, and on the next occasion I hope to give a more detailed account of the general working. In conclusion, I have to thank the directors for the courtesy I have received during my stay in England, and to assure you that, so long as I have health and strength, I will work for the interest of the shareholders.

"*Worthing, Oct.* 14, 1870."

Balance-Sheet, June 30, 1870.

Dr.			*Cr.*		
To Capital—			By Cash at bankers	£498 11 9	
£5 paid on 2000 preference shares	£10,000 0 0		Ditto in hands of secretary	6 6 4	
£5 „ 7009 ordinary ditto	35,045 0 0		Bills receivable	1,870 6 2	
£2 „ 25 „ „	50 0 0				£2,375 4 3
9034 shares.		£45,095 0 0	Office furniture		190 0 0
			Cost of works and plant, as per statement, June 30, 1869	30,869 9 8	
Debenture bonds		8,320 0 0	Add extensions during half year	89 2 0	
Sundry creditors		443 14 11		30,958 11 8	
Insurance reserve-fund		11 15 10	Less amount written off for depreciation, at the rate of 1 per cent. per annum	154 15 10	
Profit and loss		1,804 18 6			30,803 15 10
			Purchase of land		1,118 2 8
			Retort account		585 13 5
			Meter renewal account		199 17 1
			Stock on hand		6,629 3 1
			Salaries, passage-money of engineer and workmen to Singapore, travelling expenses, and wages in England	5,239 1 6	
			Preliminary expenses and law charges	828 12 8	
			Advertising and broker's commission	263 3 0	
			Rent of offices, land, stationery, general charges; auditors, directors, and local committee fees; rates and taxes	1,480 9 5	
			Loss on exchange	961 5 2	
			Interest on capital and loans	2,067 14 2	
				10,840 5 11	
			Less amount written off previously	94 13 3	
				10,745 12 8	
			Less amount written off during this half year, at the rate of 1 per cent. per annum	54 0 0	
					10,691 12 8
			Gas-meter rental, fittings, and sundries under collection, to June 1	1,213 12 6	
			Gas-meter rental, &c., for the month of June	1,868 7 9	
					3,082 0 3
		£55,675 9 3			£55,675 9 3

Profit and Loss Account, from January 1 *to June* 30, 1870.

Dr.		*Dr.*		
To Coal carbonized	£1,558 18 2	By Balance at profit and loss, June 30, 1869	£1,835 10 4	
Lime and oxide	6 19 6	Less amount declared as dividend, after deducting income-tax on preference shares	1,595 10 3	
Trade and general charges	366 0 0			£240 0 1
Rent, rates, and taxes	98 0 0	Gas and meter rent		4,469 12 4
Directors and auditors fees	205 5 0	Products, profit on fittings, and sundries		745 10 8
Salaries and collector's commission	485 19 10	Profit on exchange		27 15 0
Wages	345 0 0			
Interest on loans and debentures	307 0 3			
Bad debts and allowances	31 1 0			
Retort account	40 0 0			
Meter renewal account	15 0 0			
Depreciation on works and plant, and expenses of first establishment, written off	208 15 10			
Office furniture, written off	10 0 0			
Balance—profit for appropriation	1,804 18 6			
	£5,482 18 1			£5,482 18 1

The Chairman: Gentlemen, in moving—"That the report and balance-sheet attached thereto be received, adopted, and entered on the minutes," the observations which I shall have to make will be very short. You will see by the balance-sheet that our financial position is somewhat improved. Although we have increased our liability on debenture bonds to the extent of £2300, we have decreased the item of sundry creditors by £3700; while on the credit side of the account we have something like £600 more available in hand, so that our position as regards finance is better than it was. One of the most satisfactory points in our balance-sheet is that the item of "Plant," owing to the amount written off, actually stands at something like £65 less than it did last half year, so that you may be quite sure the dividend you are receiving is not obtained by adding any revenue expenses to capital account. The other items in our balance-sheet are much about the same as they were before. With reference to the profit and loss account, I may remark that the items are somewhat similar to the last, with the exception that we do not make so much profit as we did in the half year ending in December; but we have something like £400 more than we had in the corresponding period of 1869. The only item which seems to call for any remark is the "Trade and general charges," which is somewhat increased. This arises from the fact that the return passages of some of our *employés* from Singapore have cost rather more than usual. Mr. Wells, when he was here, made a recommendation on this point which we shall probably carry out—viz., that we should provide a fund for travelling expenses, so as to equalize the charge in each half year. Our rental has slightly increased—it is progressing, though slowly; our receipts for products are much the same, and the result of the whole is that which I have told you. You will perceive that Mr. Wells, who was for some time in this country, and whom you had the opportunity of seeing at our last meeting, has returned to Singapore. We are on the best of terms with him, and have good reason to hope that he will continue to manage our affairs in Singapore with the same ability and energy that he has hitherto done. The only other remark I have to make is that your directors have to regret the death of one of their number, Mr. Robert John Clarke, who was throughout associated with them as a firm friend and colleague. His death occurred after the report was in print, and therefore the directors were unable to announce the event to the shareholders. This is not the proper meeting for the election of directors, but probably at the next half-yearly meeting the board will propose to you that, inasmuch as they are eight in number, it will not be expedient to fill up the vacancy. I now move the resolution I have already read to you.

Mr. Cooke (deputy-chairman) seconded the motion.

A Shareholder said he observed in Mr. Wells's report that he had unexpectedly left England. It might be desirable that the shareholders should know why he returned to Singapore earlier than he anticipated.

The Chairman said there were various matters which required the attention of Mr. Wells at the works; but it could scarcely be said that he left England earlier than was anticipated. When he came here he only contemplated staying six months, but he actually stayed eight months.

The motion was put, and carried unanimously.

The Chairman moved—"That dividends be declared to the preference shareholders at the rate of 7½ per cent., less income-tax; and to the ordinary shareholders at the rate of 7 per cent., free of income-tax, on the amount paid upon their shares to the 30th of June last, payable on the 30th of November."

Mr. Cooke seconded the motion, which was also put, and carried unanimously.

The Chairman moved—"That the thanks of the meeting be given to Mr. Wells, the manager at Singapore, for the efficient manner in which he has conducted the business of the company."

Mr. Rice seconded the resolution, which was cordially adopted.

Mr. Morrison moved a vote of thanks to the chairman and directors, and congratulated them on the very successful results of their management, as shown by the balance-sheet. He suggested to them whether it would not be expedient to get the shares of the company quoted on the Stock Exchange. They were now paying so handsome a dividend, with every prospect of being enabled to continue doing so, and even to increase the rate, that he thought the shares would become more valuable. He knew there were difficulties in the way—for instance, more capital would require to be paid up; but he had no doubt some means might be devised to accomplish so desirable an object.

Mr. Hunter seconded the resolution, which was carried unanimously.

The Chairman: On behalf of myself and brother directors, I thank you very much for your confidence in us. I assure you we endeavour to do our best for the interests of the company, and I trust we shall see the concern still improve. As regards the suggestion thrown out by Mr. Morrison, the directors have not lost sight of it, but they think the present is not exactly the time for taking action on the point, and that it would be well to leave it till a more favourable opportunity.

On the motion of Mr. Rice, a vote of thanks was given to the local committee at Singapore for the interest taken by them in the company in the past as well as in former years.

The Chairman, in putting the motion, said that, during Mr. Wells's absence, more than ordinary labour had been cast upon the local committee, and the company were greatly indebted to them.

The proceedings then terminated.

Disconnecting a Gas-Meter.—Samuel Strange, a plumber and gas-fitter, was charged with wilfully removing and disconnecting a gas-meter, the property of the West Ham Gas Company, without giving notice of so doing. Defendant was at first fined 50s. and 7s. 6d. costs, but the bench subsequently lowered the fine to 20s. and costs.

BAHIA GAS COMPANY, LIMITED.

The Ordinary Half-Yearly Meeting of this Company was held at the London Tavern, on Tuesday, Oct. 25—H. P. STEPHENSON, Esq., in the chair.

The SECRETARY (Mr. A. J. Head) read the notice convening the meeting, and the following report and accounts were presented:—

The accounts for the half year ending June 30 last are herewith presented. The balance of profit and loss, after writing off the whole amount of bad debts and allowances as returned from Bahia, and the whole of the fittings suspense account, will allow the usual dividend at the rate of 10 per cent. per annum on the preference shares, and 3 per cent. per annum on the ordinary shares, leaving £126 8s. 1d. to be carried to the next account.

The unusual fluctuations in the rates of exchange between Bahia and London during the half year have entailed a loss of £455 10s. 2d., and the directors have resorted to the reserve-fund to meet this loss, that fund having proceeded from a former profit on exchange.

It is proposed to hold an extraordinary meeting after the usual business of the general meeting, for the purpose of authorising the creation of £5000 additional capital, in redeemable preference shares, bearing 10 per cent. dividend, which, if adopted, will make £20,000 of redeemable preference, same as the amount of the original preference. This capital is necessary for the construction of new and additional works, the want of which has hindered the growth of revenue and of net profits from the very commencement of the company's operations. Detailed statements will be furnished to the shareholders, in general meeting assembled, showing the expediency of this measure, and showing also that the existing capital of the company is not likely to suffer, but, on the contrary, be benefited by the outlay.

The directors retiring by rotation are Mr. H. P. Stephenson and Mr. R. J. Clarke, who are eligible, and offer themselves for re-election.

The auditor retiring by rotation is Mr. F. L. Linging, who is also eligible, and offers himself for re-election.

Dr. *Balance-Sheet, June 30, 1870.* *Dr.*

To Capital paid up—				By Concession		£7,000 0 0
5000 ordinary shares	£100,000 0 0			Investment	£86,223 0 10	
1000 10 per cent. preference ditto	20,000 0 0			Freehold land	4,534 16 1	
750 ditto redeemable ditto	15,000 0 0					90,757 16 11
		£135,000 0 0		Meters fixed		1,385 7 6
Creditors—				Office furniture and fixtures		231 10 10
On open accounts	1,297 3 9			Preliminary expenses		16,914 17 2
On acceptances	2,003 6 9			Amounts due for gas, fittings, &c.—		
		3,300 10 6		Public lamps	4,038 5 0	
Dividends unpaid		29 7 10		Ditto establishments	3,156 8 6	
Profit and loss		3,376 8 1				7,194 13 0
				Private rental, products, and fittings	5,979 11 7	
				Sundry accounts	396 15 5	
						6,376 7 0
				Stock—		
				Coals	1,904 14 4	
				Turba	23 4 10	
				Coke	59 8 0	
				Fittings	2,798 12 6	
				Meters	435 14 8	
				Main and service pipes, lamp-columns, and other materials	2,836 8 1	
						8,063 2 5
				Bills receivable		16 18 2
				Cash at bankers—		
				General account	350 2 10	
				Dividend ditto	29 7 10	
				London and Brazilian Bank (Bahia)	3,381 2 8	
						3,760 13 4
		£141,706 6 5				£141,706 6 5

Dr. *Revenue Account, for the Six Months ending June 30, 1870.* *Cr.*

DISBURSEMENTS.				RECEIPTS.		
To Coals carbonized (2239 tons)		£4,118 11 0		By Gas supplied to public lamps	£8,302 13 8	
Purifying materials		50 4 1		Less fines	181 9 4	
Carbonizing wages		813 14 7			£8,121 4 4	
Wages of lamplighters		765 5 2		Private consumers	3,206 12 5	
Labourers, loading coke, &c.		253 0 5		Public establishments	778 5 5	
Salaries		1,508 8 10				£12,106 2 2
Collector's commission		205 12 7		Meter rental		300 6 10
Directors fees		400 0 0		Products		1,106 5 1
Auditors ditto		10 10 0		Transfer fees, &c.		3 10 0
Rent and taxes		72 14 0		Profit on fittings		109 19 8
Interest		59 15 7				
Stationery		104 19 5				
Office expenses		44 5 7				
Keep of horses		53 8 0				
Trade charges		224 15 9				
Wear and tear		584 19 7				
Repairs of public lamps		249 6 5				
Travelling expenses		52 14 0				
Law charges		18 9 11				
		£9,590 14 11				
EXTRA DISBURSEMENTS.						
Total ascertained amount of bad debts and allowances	£665 7 4					
Ditto remainder of fittings suspense account—fifth and last instalments	172 9 10					
		837 17 2				
Profit		3,197 11 8				
		£13,626 3 9				£13,626 3 9

Dr. *Profit and Loss Account.* *Cr.*

To Dividend declared, April 26, 1870	£3,250 0 0		By Balance of account to Dec. 31, 1869		£3,423 19 6
Balance	173 19 6				
	£3,423 19 6				£3,423 19 6
Loss by exchange during half year	455 10 2		Balance unappropriated		173 19 6
Balance	3,376 8 1		Revenue account—net profit for this half year		3,197 11 8
			Reserve-fund, being former profit on exchange		460 7 1
	£3,831 18 3				£3,831 18 3
			Balance		3,376 8 1

The CHAIRMAN: Gentlemen, in rising to move—"That the report and statement of account as now presented be received and adopted," I shall have the pleasure to make to you a few observations. Taking, first, the balance-sheet, and comparing it with the balance-sheet of last half year, the only feature I think that calls for remark is that on the debtor side we have now £3300 due to creditors on open accounts and acceptances, as against £4300, being an improvement of £1000 in that item. On the credit side, the "Investment" remains the same; we have not increased our capital account to any extent whatever. There is one favourable feature on this side which I should like to point out—viz., the outstanding debts due to the company. Last half year they were £14,876, which was very unsatisfactory. I am glad to say that sum has been reduced, and it now stands at £13,570, which is an improvement of about £1300, and we hope the energetic steps taken by our manager will lead to a still further reduction of this item. In stating the amount of the outstanding debts at £13,570, it is right that I should tell you that over £2700 of that sum is a matter still in suspense, on account of the dispute pending with the Government, so that if we deduct this sum the amount outstanding is less than £11,000. Our stock remains about the same, and our banker's balance, including our balance in Bahia as well as in England, is now £3760, as against £550, at which it stood last year. If you turn now to the profit and loss account, and compare it with the account for the corresponding period of last year, you will find there is a reduction in the disbursements on almost every item, except salaries; which are higher; the general result being that whereas last year we had to bring in a sum of £636, the profit on exchange, to pay the same dividend we now propose, and whereas in December last we had about £400 of extraneous assets to bring in to pay the same dividend, we are now in a position to pay it without any such assistance. You will remark, in the profit and loss, that our coal, as I pointed out to you was likely to be the case, has cost us less. But while telling you this, it is right I should at the same time tell you that probably our coal in the current half year will not be laid in at such favourable prices, because the disturbance, arising out of the war on the Continent, has had a considerable effect upon freights. When last I had the pleasure of addressing you there were three points to which I called your special attention. The first was the dispute with the Government. I am sorry to say that dispute is still unsettled. The President has been away from Bahia at Rio, and no progress consequently has been made in coming to a settlement. The next point was the difficulty under which we laboured with reference to the lighting of Barra—a difficulty which has existed from the very outset of the undertaking. We have now to a certain extent dealt with that difficulty—in this respect, that we have purchased more than a mile of 9-inch main, one-half of which has arrived at Bahia, and which our manager there has instructions to lay down; the other half will be sent off as soon as we get freight for it. In addition to that we have ordered in this country a small gasholder with a cast-iron tank, which will be erected at Barra, filled during the day with the day pressure from the works, and used for the purpose of supplying that portion of the district hitherto unlighted. This will not only enable us to light 80 or 100 public lamps, but also the private lights which will accrue to us in that locality. The third point to which I drew your attention last time was the desirability of erecting a coal-jetty. We have had several plans before us for that purpose, and the directors will at once determine upon the most acceptable to be carried out. When this jetty is erected it will be of great assistance to us in the facilities it will furnish for the landing of our coal. And this leads me to the question which you will have to decide at the extraordinary general meeting which we have called immediately after the proceedings of this meeting are over. Probably it is desirable I should now make a remark or two in reference to it, as I am on the question of new works, in order to explain the recommendations we have felt it our duty to make in respect of the small extension of our capital. We have to provide the cost of the new main of which I just spoke, and of the gasholder at the Barra; we have also to provide for the cost of the coal-jetty. In addition to that, we have thought it very desirable to cover in a portion of our coal-stores, which are in a most ruinous state, and also to extend our coal-stores at Bahia. At the present time a great portion of our coal is exposed to an immense amount of rain during the wet season, and every one knows we cannot deal with wet coal with the same profit as dry coal. Again, owing to the limited amount of coal storeage we possess, we are under the necessity of endeavouring to ship coal throughout the whole of the year, and great difficulties occur at certain periods in obtaining freight, consequently we have often to pay very high rates for that purpose. By having our present coal-store

covered in, we shall be able to protect our stock from damage by wet, and by enlarging our accommodation, we shall be able to ship coal at those periods of the year when freights are most favourable. Our manager advises us that about £700 or £750 ought to be spent in the extension of our coal-stores. In addition to that we propose somewhat to enlarge our retort-benches. Like our works generally, I do not think our retorts have been erected upon the best principles, and we therefore propose to improve them, and to extend their capabilities. The whole of this expenditure will amount to a sum not exceeding £5000, and we shall recommend to you that this new capital shall be raised by the issue to our existing shareholders of £5000 of redeemable shares carrying a 10 per cent. preference dividend. You may naturally say, "Is it likely that you will be able to pay the dividend upon these preference shares without damaging the position of the ordinary shareholders?" The directors have looked at the question in that light, and have come to the conclusion that these extensions will bring an amount of extra profit to the company that will more than pay the interest on the increased amount of capital proposed to be called up. They estimate that the extra lighting at the Barra will bring them in a profit of £300, and that the saving of cost in the landing of coal by the jetty, the diminished amount of depreciation by covering the coal-stores, and the advantage which their extension will give them in reference to the shipment of coal, will give them another £300 increased profit, so that they will have about £600 a year additional to pay the 10 per cent. dividend on the new preference shares. The deputy-chairman reminds me that the additional lighting we shall obtain is not a possibility but a certainty, because the public lights are already ordered by the Government, and it is only our inability to supply them which prevents our now having the revenue from them. And I may say we have taken the private lighting at Barra merely at £50 a year, and I am quite sure it will be considerably more than that. The feeling of the directors has been that we should raise the necessary money in 10 per cent. preference shares; and, though you may naturally think these 10 per cent. preference shares would damage the position of the ordinary shares, I think I have shown that such is not likely to be the case. The only other mode of providing funds for carrying out these extensions would be to stop the payment of dividends altogether upon the ordinary shares, and apply the money now appropriated to dividends. But the directors feel strongly that, as the ordinary shareholders have on several occasions gone without dividend, it would not be fair to make them suffer in order to carry out the proposed works. As regards these new preference shares, we propose, if you adopt the resolution which will presently be submitted to you, that they should be allotted *pro ratâ* among the shareholders generally. It would amount to about one new share for every 22 existing shares. There would be an immediate call of £10 per share, and the other £10 would be called up at such times as the directors required the money.

A SHAREHOLDER: Would the new shares be allotted only to the holders of ordinary shares?

The CHAIRMAN: No, *pro ratâ* among all the shareholders—ordinary, preference, and redeemable preference. The dividend we recommend you to declare on this occasion is at the rate of 3 per cent., and if you adopt that recommendation we propose that it should be payable on the 15th of November. There is one other point which I should like to mention. Since the report has been in print, we have had to regret the loss of one of our colleagues, Mr. Robert J. Clarke, by death. He was a useful man, and a friend whom we all respected. The directors felt that it would not be proper for them, although they might have done so under the deed, to fill up the vacancy thus occasioned at the board, and a difficulty now exists to the shareholders doing so, inasmuch as the Articles of Association require that 21 days notice should be given by any candidate for the office. The directors think the best course would be, if you pass the resolution for the extension of the capital, to let the election of a director stand over until the special meeting is held for confirming this resolution. With these remarks, I now move the adoption of the report.

Mr. NICHOLSON seconded the motion.

Mr. H. BROTHERS congratulated the directors on the improved state of accounts laid before the meeting. Although the working appeared to be a little better, the shareholders could not get beyond their 3 per cent. Under these circumstances he thought the amount of remuneration to the directors was rather too large. At the same time he considered that the remuneration to the auditors was too small. A greater satire upon the origin of the company and the state of the works could not be penned than the statement in the directors report, in which it was stated that the additional capital now to be asked for was necessary for the construction of new and additional works, the want of which had hindered the growth of revenue and of net profits from the very commencement of the company's operations. Here was a company which had cost more to start than any other company with which he was acquainted, and after many years working the shareholders were now told that the works now to be undertaken should have been done originally. He would like the directors to inform the meeting whether the £5000 was to be spent under the same auspices as the £90,000 had been.

Mr. NICHOLSON said it was not.

Mr. MORRISON said he differed with Mr. Brothers as to the amount of remuneration to the directors. From his knowledge of the operations of foreign companies, he was inclined to think the directors had much more work to do than was generally supposed. With regard to the auditors, he admitted that their fees were too small. One thing which struck him in looking over the accounts was the "Loss by exchange." He assumed that this was only a question of account; that it was an estimate upon the present rate, and might not be realized. Then as to the item of "Bad debts," he assumed that the whole amount charged was not attributable to the past six months.

Mr. BLAKE said, as far as he had analyzed the accounts, the bad debts in 1864-5 were *nil;* in 1866 they began to appear; in 1867 they were £41; in 1868, £481; in 1869, £684; and now £665. Surely this must be the accumulation of arrears, and even then it was a very large amount.

Mr. NICHOLSON read the whole sentence: "To total ascertained amount of bad debts and allowances."

Mr. BLAKE said it was quite right that attention should be drawn to these matters. In one instance, that of the cost of lamplighters, at one time it amounted to £1200 in the half year. After reiterated complaints about this enormous charge, he was glad to see it was now reduced to £765, which showed the good effect of bringing such things under the attention of the board. With reference to the proposed new capital, he confessed that at first sight it seemed as though the effect would be to crush the ordinary shareholders, because at that time it was unaccompanied by the chairman's explanation that the outlay would result in additional business. He had thought that the capital account of the company was closed, and that the directors would look to the revenue for any additional expenditure rendered necessary. He felt that the holders of the new preference stock would be in a somewhat unfortunate position, and that it would be better to make it ordinary preference stock than redeemable; for this reason, that whenever in future time there might happen to be a surplus profit of a few thousands, and it should be proposed to apply it in redeeming some of this new capital, the ordinary shareholders, remembering that for many years they had only had 3 per cent., would feel that this money ought to be appropriated by way of increasing their dividends. The directors would never get them to consent to pay over a large sum out of profits to redeem this stock.

Mr. NICHOLSON said he happened to be chairman of the company when the statement was made that the capital account was closed. The remark he made on that occasion was that a great deal had been said about the closing of capital accounts of railway companies; but in the case of the Bahia Gas Company it had been closed by exhaustion. They had then no other capital than was involved in the working accounts of the company. But he did not pledge himself that, for all time to come, there should be no new capital created. He hoped, indeed, that the statement of the chairman of this meeting had convinced the shareholders that the time had arrived when new capital must be provided. And the alternative was this—it must either be provided in the way proposed by the directors, or the ordinary shareholders must go without their dividends for two or three years. The shareholders would decide this question when the recommendation came before them. With reference to the observation made by Mr. Brothers, he quite agreed that the language of the report was a satire upon the works as originally constructed. In fact, as he had before said, there were deficiencies in the first instance such as hardly any company, whatever its revenue, could escape paying the penalty of. He (Mr. Nicholson) had never blinked the issue that they had all along been suffering from two most unfortunate circumstances—one, the corruption of the servants at Bahia; the other, defects in the construction of the works. The question for them to decide now, as practical men, was whether they would continue to go on with the works in their present state, or at once put them in proper order, so as to give a profit to the ordinary shareholders. The directors were of opinion that when the new jetty was erected, the new gasholder constructed at Barra, and the enlarged mains laid, a marked improvement would be realized in the working of the company. With regard to the fees paid to the directors, he did not think, looking at what was done in other companies, and knowing the amount of personal labour and anxiety which the directors had to undergo here, it was at all in excess. It must be remembered also that for several half years they had no remuneration at all. It was true, as had been remarked, that the item of "Salaries" had been increased. The reason was that, during the last eighteen months, the directors had been sending out men from London to fill offices in Bahia which had previously been filled by natives, to put a stop to dishonest practices to which the company had been exposed. If the accounts were to be properly kept, the stores properly cared for, and the business correctly attended to, they must send out persons from England in whom confidence could be placed. The directors, in these ways, were trying to remedy both the defects he had referred to.

Mr. WILSON asked what was the nature of the difficulty with the Government.

The CHAIRMAN said it was on the construction of the terms of the contract. The Government contended that the charge should be only 195 reis per lamp per night—the company contended that it should be 200 reis. The directors had taken the opinion of counsel in London on the question, and were advised strongly that their view of the matter was the correct view. The question was rather complicated by the progress of the company and the extension of the lamps. Replying to some of the observations which had been made, he remarked that he did not suppose under any circumstances the directors would ever use the ordinary profits of the company to redeem the preference capital. But what they did contemplate was, that if the company improved in position, they would hereafter probably be able to issue fresh capital to the shareholders at a lower rate, for the purpose of redeeming the preference stock. There would be nothing unfair in such a transaction, because the preference shares would be in the possession of the ordinary shareholders, and the saving effected would go to increase the dividends upon their original investment. With regard to the cost of lamplighting, it was true it had been reduced, but it must be borne in mind that the reduction in this item had been effected somewhat at the cost of the gas. At the time the lamplighters wages were very high, a large number of men lighted fewer lamps; now a smaller number lighted a larger quantity, so that a certain amount of waste of gas was created by the extra time the lamps were alight. As to the bad debts, he had explained on a former occasion that when Mr. Kilkeary arrived at Bahia, two years since, he found that, through the neglect of previous managers, there was a large mass of arrear accounts, of which the directors were advised that probably there might be £1500 or £2000 bad. From time to time the directors had written off amounts on account, and they were now in a position to say that they believed they had written off every ascertained bad debt. Of course there would be bad debts accruing in the future, but it was matter for congratulation that the arrears of previous mismanagement had been swept away. The directors had also written off, as would be seen, the second instalment on the fittings account, which they believed put the fittings stock free from the defalcations previously referred to. Mr. Morrison had made an observation on the loss of exchange, and he was quite right in saying it was more nominal than real—a matter of account. It arose in this way. The company received from the Government payment at the par of exchange—*i. e.*, 27d. per milrea—and when the exchange was at 1s. 7d. or 1s. 8d., they paid the difference between the two rates. But with the private consumers the company were paid always in milreas, so that sometimes there was a nominal profit and sometimes a loss, and whichever was the case, the amount was carried to the credit or debit of the reserve-fund.

The resolution was then put, and carried unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 10 per cent. per annum upon the preference capital, and of 3 per cent. upon the ordinary capital of the company, for the half year ending the 30th of June last, be and the same is hereby declared."

Mr. NICHOLSON seconded the motion, which was put and carried.

Mr. Stephenson was then re-elected a director, and Mr. Linging an auditor of the company; and, on the motion of Mr. BROTHERS, the remuneration to the auditors was increased from 20 to 40 guineas.

This closed the business of the ordinary meeting.

An extraordinary meeting was then held, for the purpose of obtaining the sanction of the shareholders to an increase of the capital of the company to the extent of £5000.

The CHAIRMAN having briefly restated the purpose for which the increased capital was required, moved the following resolution:—

Resolved—That the directors be and they are hereby authorized to further increase the capital of the company by the creation and issue of 250 new shares, of the nominal value of £20 each, and of the aggregate amount of £5000.

Resolved—That such shares be issued on the following terms and conditions, that is to say: they shall entitle the holders thereof to a preferential dividend of 10 per cent. per annum, to be payable each year only out of the profits of that year, in priority to the existing ordinary and perpetual preference shares of the company, and on an equality with the existing redeemable preference shares already issued; they shall also entitle the holders thereof to the same rights and privileges, as to voting qualifications and otherwise, as if part of the original capital of the company; the company, however, to have power to redeem or repurchase all or any of such shares at par at any time after the expiration of five years from the issue thereof, upon giving six calendar months notice of their intention so to do to the registered proprietors of the shares to be so repurchased.

Mr. COOKE seconded that resolution.

Mr. ATTRELL thought it was hardly worth issuing shares for so small an amount of additional capital, and suggested to the directors whether they could not borrow the amount from their bankers at a lower rate of interest.

Mr. COOKE said if the money were only required for a temporary purpose, it might be well to borrow it in the way suggested; but as it would be a permanent investment, it would not be advantageous to do so.

Mr. BROTHERS thought the money might be raised at a lower rate of interest than 10 per cent.

The CHAIRMAN said the directors had well considered the question, and believed they could not offer less than 10 per cent., but if the shareholders to whom the shares would be allotted were content with 7½ per cent., the directors would be quite agreeable to it.

The motion was put, and carried unanimously.

On the motion of Mr. WILBRAHAM, seconded by Mr. FINLAY, thanks were voted to the directors; and the CHAIRMAN having acknowledged the same, the proceedings terminated.

EQUITABLE GASLIGHT COMPANY.

The Half-Yearly Ordinary General Meeting of the Shareholders of this Company was held at the Office, John Street, Adelphi, on Tuesday, Nov. 1—Sir JAMES DUKE in the chair.

Dr. *Manufactory and Revenue Account, for the Half Year ended June 30, 1870.* *Dr.*

To Tradesmen's accounts, purification, &c.	£385	4	6	By Gas-rates, to June 30, 1870	£42,553	17	
Coals carbonized	19,643	8	1	Meter-rental	821	12	
Wages (manufacture only)	4,564	16	3	Coke, net sales and stock	7,046	9	1
Rent, rates, and taxes	809	2	3	Breeze, ditto	44	18	1
Directors fees	750	0	0	Tar, ditto	1,687	11	
Auditors ditto	45	0	0	Ammoniacal liquor	896	17	
Salaries	1,827	14	10	Interest account	143	17	
Collectors commission	701	10	0				
Stationery and stamps	128	6	7				
General charges	269	18	5				
Bad debts and allowances	166	13	6				
Wear and tear	3,824	16	11				
General law charges	16	3	4				
Income and property tax	110	9	3				
Depreciation of leasehold property and plant on ditto	364	10	4				
Parliamentary expenses	40	4	3				
Net profit to June 30, 1870	19,547	5	10				
	£53,195	4	4		£53,195	4	4

Dr. *Balance-Sheet.* *Cr.*

To Capital, joint-stock—				By Investment to Dec. 31, 1869	£273,935	9	7
Old shares, £50	£200,000	0	0	Less depreciation of plant, &c.	268	1	4
New ditto, £25	100,000	0	0		£273,667	8	3
Dividends	26	12	4	Charged this half year	425	5	9
Tradesmen's accounts, &c.	4,951	14	8			£274,092	14 0
Taxes, rates, &c.	798	1	4	Meters		6,923	18 5
Collectors commission	335	5	10	Cash on deposit		20,076	7 2
Auditors	45	0	0	Ditto balance		3,965	1 11
Profit and loss	29,914	4	11	Gas-rates		14,612	11 9
Contingency-fund	10,042	1	1	Accounts due for coke, &c.		3,303	5 3
				Coals, stock		2,342	4 1
				Coke, ditto		40	0 0
				Breeze, ditto		4	7 6
				Tar, ditto		78	2 6
				Service-pipes, ditto		207	17 0
				Main-pipes, ditto		632	6 9
				General stores, ditto		1,672	19 9
				Leasehold property		8,024	19 6
				London and North-Western debenture stock (£10,050)		10,000	0 0
				Income and property-tax		136	4 7
	£346,113	0	2			£346,113	0 2

Unappropriated profits to Dec. 31, 1869	£10,366	19	1
Net profit to June 30, 1870	19,547	5	10
Amount available for dividend	£29,914	4	11

The CHAIRMAN: Gentlemen, you will readily believe that the first duty I have to perform to-day is one of a very painful character. It is to announce that since we last met you our esteemed friend, Mr. Martelli, has been removed by death. We owe a debt of gratitude to our late distinguished chairman, who rendered us most valuable service for so many years, and I have to express for my own part, and on the part of my colleagues, our deep regret at the loss which the company have sustained by his decease. The board have been kind enough to ask me to take his place, and, in acceding to their invitation, I can assure them and you that my best endeavours will always be exerted to promote the welfare and interest of the company. We have been anxious to take the opportunity of filling up the vacancy in the direction, but there have been reasons why we did not do so sooner. We now propose to meet again on the 22nd of this month, to elect a gentleman to succeed Mr. Martelli at the board, and I can assure the proprietors that whoever they may be good enough to appoint to the office, he will be received most cordially by my colleagues and myself. Gentlemen, you have no doubt observed in the report of the proceedings at the meeting of the London Gas Company that the chairman made reference to the very friendly and harmonious relations existing between that company and our own. I am happy to confirm that statement, and to inform you we have been able to make an arrangement to supply them with cannel gas on terms which are mutually satisfactory and advantageous. We have at the same time been enabled to lease from them one of their stations, upon which there are three large gasholders. This will be a very valuable acquisition to us as the demand for gas increases. We can assure the directors of the London Company that we cordially reciprocate the kind and friendly feelings which they have expressed towards us. With reference to our own company, I venture to say, without any disparagement to our neighbours, that there is no company in the City of London, or elsewhere, which is in a better condition in every respect. Our works are in first-rate order, and no pains are spared to maintain their efficiency in every respect, and I have no hesitation in affirming that both our management and economy, as shown by our report, are such as to justify the fullest satisfaction on the part of the proprietors. I am happy on this occasion to give you the best possible proof of the ability and efficiency with which our works are conducted, by making the announcement that, on the 1st of January next, we intend to give the public the benefit of a further reduction in the price of gas. We also hope, at the same time, to be able to increase the illuminating power of the gas, and to maintain its quality as to purity. At the same time, you must bear in mind that our ability to continue the low price and high illuminating power of our gas greatly depends upon our being allowed to carry on our operations free from the interference of Parliament and of out-door agitation, which detracts so much from the prosperity of the company. I hope in the step we are about to take that the public will see we do not require Parliament to urge us to do this or that. We are always anxious, whenever the interests of the proprietors will allow it, to improve the article we supply to our consumers, and to reduce its price as much as possible. There is only one point in our accounts to which I am at all desirous to draw your attention—though it is one which I think cannot have escaped your observation—and that is the extraordinarily small amount of our bad debts. I am connected with other companies, which manage their affairs very well; but I confess I never knew a company having, as we have, a number of small accounts to collect, in which the sum appearing under this head in the profit and loss account was so utterly insignificant. I think we are greatly indebted for this satisfactory state of things to the energy and good management of our excellent collectors. I have already said that the condition of our works would do credit to the officers of any company, and I am sure that those of our proprietors who choose to take the opportunity of visiting the works of the Equitable Gas Company will endorse the opinion I have expressed—that they are second to none. Gentlemen, I think I have no further observations to make, except to express the satisfaction of the directors at the manner in which the auditors have certified the accounts. They have not only, as usual, examined all the vouchers, but they have been to the bankers, and seen that your securities are in safe custody. We like to have auditors who go to the fountain-head to satisfy their inquiries. With reference to our officers, I am sure I need say nothing of our friend the secretary, who is a most valuable officer of the company, nor of our excellent engineer, Mr. Brothers. We have great confidence in them, and they never fail to give us every satisfaction in the ability and energy which they bring to the discharge of their duties. With these observations, I now move—"That the report of the board of directors, together with the accounts, as examined and certified by the auditors, be received and entered on the minutes."

Mr. KELLY (deputy-chairman) seconded the motion.

Mr. LIDDLE said he had seldom heard a speech from the chairman of a meeting which gave him more pleasure than that to which he had just listened. Referring to the lamented death of Mr. Martelli, he said he had been afraid that the vacancy thus created at their board would not be filled up. He was glad, therefore, to learn from the chairman that the election of a new director would shortly take place. It was the habit in some companies not to supply the places of those members of the board who were thus removed, and their colleagues had not the candour to hand back a proportionate share of the remuneration, but divided it among themselves—a practice calculated to bring boards of directors into discredit, and to raise a prejudice in the public mind. Directors at the present time were placed in a position in which the eyes of the public were upon them, and their actions were very carefully scrutinized. It was certain that wherever the business of companies was conducted as he was glad to acknowledge the business of the Equitable Gas Company was carried on, there would be no ground for dissatisfaction or the withdrawal of the fullest confidence. He sympathized entirely with the directors in the regret expressed by them through the chairman at the death of Mr. Martelli, whose courtesy of manner and whose great intelligence must have made him a most useful colleague. He was sure the shareholders generally would feel the loss, and regret that they did not see him in his accustomed place that day. Referring to the balance-sheet, he (Mr. Liddle) wished to know on what principle the depreciation of plant was calculated.

The CHAIRMAN said it was upon an actuarial calculation of the value of the plant upon the leasehold portion of the works.

A SHAREHOLDER thought the amount charged under the head of collectors commission was large.

The SECRETARY said the collectors were only paid upon what they got in, and therefore the large amount of commission was a fortunate circumstance.

The motion was then put, and carried unanimously.

On the motion of the CHAIRMAN, it was resolved—"That a dividend be now declared out of the profits of the concern, for the half year ending the 30th of June last, of £2 10s. per share on the old shares, and of £1 5s. per share on the new shares, less income-tax; that the said dividends be payable after the termination of this meeting, and that the warrants be forwarded by post to the registered address of each shareholder, unless otherwise ordered."

Mr. HADLAND moved—"That the thanks of this meeting be given to the chairman and board of directors for their successful management of the affairs of this company." He thought the accounts laid before the shareholders testified the truth that great care and attention had been bestowed by the board upon the business and general interests of the shareholders, and therefore he had great pleasure in submitting this motion.

Mr. TATHAM, in seconding the motion, asked whether, when an addition was made to the remuneration of the board at the last meeting, any addition was made to that of the auditors.

The SECRETARY replied in the negative.

Mr. TATHAM said in that case he would give notice that at the next meeting he would move to increase the remuneration of the auditors by £60 per annum. He asked why there were three auditors, and whether two would not be sufficient.

The SECRETARY (Mr. Andrews) read the advertisement convening the meeting, and the minutes of the last meeting, which were approved.

The following report and statement of accounts were presented:—

The directors herewith annex a statement of accounts, as certified by the auditors, showing the satisfactory results of the company's operations for the half year ending the 30th of June last.

The net profit amounts to £19,547 5s. 10d., and the directors recommend that a dividend of 5 per cent. on the half year be declared and paid forthwith.

A further sum of £5000 has been carried to the contingent-fund, and invested in the same security as the previous amount, making £10,000 invested on that account.

The directors announce with much regret the death of their late chairman, Mr. Martelli, whose valuable services were always available for the company's interest.

The CHAIRMAN replied that the number was regulated by Act of Parliament.

Mr. TATHAM said such being the case he had nothing more to say. He wished to urge upon the attention of the board the propriety of issuing certificates for every individual share in the company. He did not see that there could be any objection to it; it was the almost invariable custom in companies, and was found to be of great advantage.

Mr. WHEELER said he thought it would be very inconvenient, especially to large holders. Almost every company was now endeavouring to convert shares into stock, so as to require only one certificate, and to do away with the multiplicity of paper.

The SECRETARY said in this company a memorandum of registration was issued, and any shareholder who desired it could have a certificate. During the many years he had been connected with the company, he had never known a single instance of irregularity or inconvenience arising out of the present practice.

The motion was put, and carried unanimously.

The CHAIRMAN: I beg to thank the honourable proprietor who so kindly proposed this vote, and the meeting for so cordially accepting it. I hope you will believe that it is the great desire of the board to justify the approbation expressed by the shareholders, and the confidence reposed by them in the directors, and that we shall do all in our power to uphold the high character of the Equitable Gas Company.

On the motion of Mr. HADLAND, a vote of thanks was given to the auditors, for the ability and care with which they had discharged the duties of their office.

Mr. MICHAEL said the auditors were much indebted to the meeting for this expression of approval. He might state that, being largely connected with companies, he had never seen one in which the accounts were so admirably kept as in this company. There was not a single figure in the accounts which had not been carefully checked by the auditors. Their work was much lightened by the fact that the directors at their meetings from time to time kept an efficient control over the accounts. It was an admirable thing when this was not left to a perfunctory audit once in a half year, but when a continuous oversight was kept over the affairs of a company, both with reference to assets and liabilities, as was done in the case of the Equitable Gas Company.

The proceedings then terminated.

[ADVERTISEMENT.]

THE CORK GAS COMPANY AND STILL AND LANE'S PATENTS.

TO THE EDITOR OF THE "JOURNAL OF GAS LIGHTING," ETC.

SIR,—I observe in your last number the report of a meeting of the Cork Gas Company, in which, to a considerable extent, I am interested.

The chairman congratulates the company on the directors being able to pay a dividend of 8 per cent., and leads the shareholders to expect with confidence that the dividend will be as high, and even higher, in future. This prosperous state of the company the chairman ascribes entirely to the merit of their engineer and secretary, Messrs. Still and Lane; and their merit consists, according to the chairman, in discovering a new method of producing a better gas than heretofore at a cheaper rate, and obviating difficulties that had baffled gas engineers for many years—Mr. Lane says 30—in their efforts to obtain this result. It is to this "happy invention," says the chairman, "of Mr. Lane and Mr. Still," that it is in the power of the company to pay 8 per cent. It is to their "skill and perseverance" and "long and patient labour" that this great result is due; and, in order to testify the company's opinion of the invention, and the merits of Messrs. Lane and Still, the company resolve to give these gentlemen the very handsome sum of £1000. It further appears in the same report that negotiations are going on with other gas companies for the use of this meritorious and valuable discovery.

It is in this part of the report that I am interested, because I think it is my duty, as well as my right, to warn these negotiating companies, and the public generally, that the "happy thought" never occurred to Messrs. Still and Lane, and that their labour was neither long, nor patient, nor skilful, but simply as much as was necessary to borrow and transfer the "happy invention" from two patents of mine, for making gas from oil and other oleaginous matter, to two patents of theirs.

The chairman describes the invention of Messrs. Still and Lane thus: "The nature of the invention consists in the *thorough combination of small coal* with coal tar. All gas engineers have been aware of the great amount of illuminating power contained in coal tar; but, though they have tried various experiments, they have been unable to make use of them in consequence of the practical inconvenience arising from the stoppage of the pipes from deposits of tarry matter."

You will observe that the invention is not the application of a known principle to tar as a substance different from oil or other oily matter, but is said to lie in the *combination of small coal* with the tar; and the advantage of this combination is (as I have underlined) that it prevents the stoppage of the pipes "from the deposit of tarry matter"—more likely the deposit of pitch. Allow me now to give you a description of the discovery in my two patents, dated 1866-1867, two years before the Cork Company got the benefit of Messrs. Still and Lane's "invention."

The first is dated March 15, 1867. It is for improving the illuminating power of gas with important economical results, and, according to the specification, the invention or discovery "consists in combining coal with shale or other mineral oil." For this purpose, says the specification, "I combine the coal and oil in the proportions of 30 gallons of oil to 1 ton of coal." I "take coal already existing in a pulverized state," or "reduce the coal to a pulverized state by grinding. I combine the oil and coal by intimately mixing the oil with the pulverized coal." "The mixing may be effected in a mixing or grinding mill." The mixture is then put into ordinary gas-retorts, and subjected for distillation or decomposition to a "strong heat," never less than "a bright red heat." "A carbonaceous residue or coke is left in the retorts, as with ordinary gas coal, and being of good quality will, by its use or sale, reduce the cost of the illuminating gas."

On the 15th of June, 1867, I took out a second patent for an improvement upon this, stating as a defect in it that "when the whole of the coal is minutely pulverized, it has a tendency to be carried into and stop up the pipes and apparatus of the gas-works," and therefore, says the specification, part of the coal should be minutely pulverized with the oil or other oleaginous matter, and this compound coal and the coal in its ordinary state requires only to be roughly intermixed; and as to the proportions of the two sorts of coal, it recommends one-half of each. Thus, if "30 gallons of oil are to be used with 1 ton of coal, then by my present invention the 30 gallons of oil are thoroughly combined with half a ton of coal, and the compound or mixture thus obtained is added to or roughly mixed with the remaining half ton of coal in its ordinary state." The specification adds that the *proportions of pulverized and ordinary coal* may be varied as you wish the gas of a higher or a lower quality.

You will observe, then, in this invention and improvement—first, that there is to be a mixture of oil or oily matter with coal, and that by the first patent the whole coal is to be pulverized; second, that the proportions of coal and oil are to be 30 gallons of oil or oily matter to 1 ton of coal, and in my second patent that the proportions of pulverized coal and ordinary coal in the mixture are generally to be one-half of each, but may be varied according to the quality of the gas required, and that the coke from this compound is of such value as to materially reduce the cost of the gas.

This invention of mine, consisting of these two patents, was tried in the gas-works, Dublin, and Messrs. Still and Lane were invited to see the mode of production and its results. They did visit the works for the purpose, and did see the whole points of the discoveries, the mode of working them, and their results during the years 1867 and the beginning of 1868, and they had besides copies of both specifications. With these advantages it was not difficult to make the great discovery so highly praised by the Cork Company.

Their first patent is dated April 9, 1868. Its purpose is, "Improvements in the manufacture of gas," and for this end, according to the specification, "We mix small coal with gas tar. We mould the mixture into bricks or blocks. These bricks or blocks we charge into gas-making retorts, and heat them to a bright red heat, and so we obtain an illuminating gas of good quality, when at the same time the bricks or blocks are converted into a hard and valuable coke. The tar and small coal may advantageously be mixed in the proportions of, say, 30 gallons of tar to, say, 1 ton of small coal;" or, continues the specification, "in some cases (they may say in *all cases*) we distil the gas tar before using it to make the bricks or blocks, and thus separate the naphtha and pitch for sale and use, to make the bricks or blocks the *intermediate product called dead oil*." According to this specification the *whole coal* is to be pulverized, from which I infer they were not yet aware of the advantage of pulverizing a part only. They soon learned, however, as appears in a second patent they received in June, 1869.

In this patent, Still and Lane make a reference to their first. It is nevertheless the same as the first, except in these particulars: that instead of *gas tar* they now call their oily matter *coal* tar; that bricks or blocks are dismissed from the process; and that the improvement of pulverizing *but a part* of the coal is adopted. "The invention is for improvements in the manufacture of gas," and, says the specification, "we mix in a *pug mill* coal tar with *small coal*. We pass the mixture through heavy edge runners or crushing rollers, and this mixture is *then combined with ordinary coal* and put into the retorts in the *proportions of 30 gallons* of tar to every ton of coal, and *the proportion of mixed material added to ordinary coal* depends upon the extent to which it is desirable to increase the illuminating power of the gas."

You will thus see that the final discovery of Messrs. Still and Lane is to mix pulverized coal with coal tar, grind the mixture through rollers (which is just my mortar or loom mill), combine the mixture with coal in its ordinary state, put the whole into the retort in the proportion of 30 gallons of tar to every ton of coal, make the proportion of ordinary coal to small coal more or less, as you want a lower or a higher quality of gas, and employ in the distillation a bright red heat. After thus getting your gas, there will be, says one of the specifications, a residue of valuable coke, to be sold, of course, at the best price, and so reduce the cost of producing the gas.

You will now easily perceive that the apparent difference (if difference it can be called) between this meritorious invention of Still and Lane and mine is, that they employ coal tar in their mixture, or as they honestly or unwarily confess, the dead oil of coal tar, whereas my patents are for the use of mineral oil, or other oleaginous (that is oily) matter. In all other respects the so-called inventions of Still and Lane are palpably taken from my specifications. The pulverizing of the coal in whole or in part, the proportions of coal to oil or tar, the grinding of the mixture of pulverized coal and oil or tar, the proportions of ordinary coal to small or pulverized coal, the nature and value of the residue after the gas is evolved, and in the difficulties thus overcome and never before "solved by gas engineers"—in short, in everything which resides in the "happy thought," the result of so much "skill and perseverance," "long and patient labour," and diminution in the cost of production, in all these—and there is nothing in the patents but these—my inventions and Messrs. Still and Lane's "discoveries" are not only substantially but exactly alike. The coincidences in the processes can hardly be accidental, as there are no differences.

In such circumstances few will doubt that Messrs. Still and Lane have borrowed my discoveries, and under that conviction I have complained to them and the Cork Gas Company, and endeavoured to bring them to an arrangement by an appeal to their sense of justice. As that has failed, I have commenced legal proceedings for the piracy, both against the company and the patentees; and, therefore, I have thought it due to the public to warn them in this form of the character of Messrs. Still and Lane's so-called invention, and the risk which may be run by all who use it without my permission.

(Signed) GEO. M'KENZIE.

37, *Abbotsford Place, Glasgow, Oct.* 6, 1870.

PREVENTION OF THE SPONTANEOUS COMBUSTION OF COALS.—Dr. A. Lachmann suggests that, in order to prevent as much as possible the chances of spontaneous combustion of coal on board ships and in the coal-bunkers of steam-vessels, coal should be selected as free as possible from brasses (iron pyrites); to load the coal rapidly, and in as dry a state as possible; to stow them on board properly, but not too closely; to prevent, if possible, all access of air and water; and to sprinkle them with thin coal tar.—*Chemical News.*

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS, IN OCTOBER, 1870.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Comps.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	16·97	0·049	0·091	0·004	13·8	3·2
West Middlesex	16·40	0·045	0·132	0·001	15·3	3·2
Southwark and Vauxhall	16·60	0·057	0·075	0·002	13·6	3·2
Chelsea	16·93	0·064	0·091	0·004	13·9	3·3
Lambeth	18·90	0·057	0·091	0·002	13·9	3·4
Other Companies.						
Kent	26·97	0·006	0·182	0·000	20·0	5·5
New River	17·10	0·022	0·110	0·000	13·6	3·0
East London	16·03	0·014	0·099	0·002	12·7	3·3

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and, in the case of the metropolitan waters, the quantity of organic matter is about eight times the amount of oxygen required by it. The water was found to be clear and nearly colourless in all cases but the following, when it was slightly turbid—namely, in the case of the water of the Grand Junction Company.

The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 106,316,302 gallons; and the number of houses supplied was 481,620. This is at the rate of 33·7 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 29·3 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne. H. LETHEBY, M.B.

PRESENTATION TO THE CHAIRMAN OF THE CAMBRIDGE GAS COMPANY.—Last Thursday afternoon, a meeting was held in the rooms of the company, for the purpose of making a presentation to Dr. Phelps, the chairman. The chair was occupied by C. Balls, Esq., the mayor. The object of presentation was a very elegant epergne, with a tripod base, in pure Grecian style, costing about £100, and furnished by Messrs. Reed and Co., of the Market Hill, silversmiths. It bore the following inscription:—"Presented to the Rev. Robert Phelps, D.D., Master of Sidney Sussex College, and Chairman of the Cambridge University and Town Gaslight Company, by the shareholders of the company, in recognition of valuable services rendered to this company. Nov. 1870."

Register of New Patents.

2866.—RICHARD BROADBENT, of 11, Islington, Birmingham, in the co. of Warwick, gas engineer, for "*Improvements in gas-governors.*" Patent dated Oct. 2, 1869.

The first improvement consists in providing a seating for the valve to act against, the seating being composed of Tangye's patent metal. The introduction of the seating into gas-governors ensures the valve securely closing the opening when it touches it; it also provides against the corrosion of the metal at that part.

In order to prevent the vibration of the valve and the disc or diaphragm when there is an excessive pressure of gas, a spiral spring is fitted on the top of the diaphragm to counteract the effect of the vibration or dithering. The spiral spring is weighted, to overcome the tendency to the tremulous motion of the disc and valve. In lieu of the spring a rod with a curved end is sometimes employed. The rod is secured on a cross-bar or spindle, one end of which passes into a hole in one cheek of the box, while the other rests in a notch on the other side of the box. A balance-wheel is fitted on one end of the spindle to act as a check weight to the motion of the disc. There is another rod projecting from the spindle, on which a weight is set and secured to give the proper adjustment to the governor.

2897.—SQUIRE FARRON, of Ashton-under-Lyne, in the co. of Lancaster, brass-founder, for "*Improvements in the construction of cocks or taps.*" Patent dated Oct. 6, 1869.

This invention consists in making the casing of the cock or tap with a conical hole, in which a hollow plug fits. The water or other fluid passes through an inlet passage in the casing into the lower end of the plug, and it escapes through passages in the plug and in the casing. The plug is tightened in the conical hole of the casing by regulating screws.

2900.—JOHN WILLIAM POWELL, of East Lane, Bermondsey, in the co. of Surrey, brassfounder, for "*An improved valve-cock.*" Patent dated Oct. 6, 1869.

This invention consists in the construction of valve-cocks with an ordinary conical spindle, or india-rubber valve and seating, the spindle being made so as to extend beyond the outlet-pipe, and the end of the spindle being provided with a stuffing-nut to prevent leakage.

2920.—JOHN HILTON, of the Albert Road Iron-Works, Farnworth, in the co. of Lancaster, ironfounder, for "*Improvements in casting socket and flanged pipes.*" Provisional protection only obtained. Dated Oct. 8, 1869.

This invention relates to improvements in casting socket and flanged pipes ready to be connected together when taken out of the sand, without having to be first turned, faced, or bored, as has hitherto been necessary, and consists in the use and application, to the purpose of casting such descriptions of pipes, of what are technically termed "cast-iron chills," of the necessary shape to form the socket or spigot ends, which chills are fixed in the proper position upon the core-bars or barrels either by lock-nuts, keys, or in any other convenient manner. The patterns from which such pipes are cast have suitable prints left upon them to form the necessary impression in the sand to receive such chills, so that when the core-bars are placed in the mould, and the molten metal is poured in, such molten metal comes in contact with the chills, and thus produces a smooth and true cylindrical or conical surface in the socket and upon the spigot ends. For flanged pipes the application is precisely the same, the chills only differing in shape to form the flanged surfaces.

2932.—CLINTON EDGCUMBE BROOMAN, of the firm of Robertson, Brooman, and Co., of 166, Fleet Street, in the City of London, patent agents, for "*Improvements in liquid-meters or apparatus for measuring the flow of liquids.*" A communication. Patent dated Oct. 9, 1869.

In this apparatus two moving cylinders are employed, each divided into two equal parts by a transverse partition. They are disposed parallel to one another, and receive from the water, which acts upon their partitions (thus serving as pistons) an alternating rectilinear movement, which is utilized by special transmission or gearing apparatus to effect a continuous rotation of clockwork attached to a dial and index hand. Each of these cylinders forms a sleeve with two cylinders fixed concentrically with it, and to which it is united by elastic means, which permit it to slide to and fro upon the other cylinders and make a perfectly tight joint with them.

2933.—JAMES CHANDLER, of 17, Cottage Grove, Mile End Road, in the co. of Middlesex, for "*Improvements in apparatus for drawing and preventing waste of water from pipes, mains, cisterns, or other sources for domestic or other purposes, also for water-closets.*" Patent dated Oct. 9, 1869.

These improvements refer chiefly to the employment of a cistern, the capacity of which contains the maximum quantity of water it may be found necessary to deliver or draw at one operation. In the inside of the cistern is attached a ball or float valve, which is in communication with the source of supply. To this valve is a attached a second valve, which communicates therewith, the second valve is attached by a lever or otherwise to a third valve, communicating with the discharge outlet or nozzle leading from the cistern. The handle or lever by which the apparatus is worked is attached to both the second and the third mentioned valves in such a manner that, before the valve communicating with the discharge outlet is opened, the other is shut. The second valve, however, works independent of the first-mentioned ball or float valve.

The action of the apparatus is as follows:—Upon operating on the handle or lever the second-mentioned valve is closed, and by a little strain on the handle the third-mentioned valve is opened, which allows the contents of the cistern to flow out while the float-valve or cock is gradually opening, and on letting go the handle or lever the third-mentioned valve closes, and the second one opens and allows the water to flow into the cistern from the source of supply through the float-valve or cock, whereupon the said ball-valve comes into action, and the water is allowed to gain its original level, and shuts off the supply. Thus it will be understood that in this apparatus the valve communicating with the discharge nozzle or outlet closes before the valve communicating with the source of supply opens, and consequently no water can run to waste from the source of supply. Any quantity of water below the maximum can be drawn off without waste, as this apparatus is self-closing.

The next improvement is applicable to this and all other kinds of water-cisterns in use for flushing water-closets where what is called the patent or pan closet is adopted. It consists in attaching to the bottom of the cistern a second receiver, inside of which is an overflow-pipe, which reaches within, say, half an inch of the top of it, and communicates with the closet. A small hole is made in the bottom of the overflow-pipe, and leads into the receiver, the object being that, should a person discharge the whole of the contents of the larger cistern through the closet, *minus* the capacity of the receiver, sufficient water will be left in the receiver to charge the pan, the water running slowly through the small hole into the said pan. Of course, the water from the larger cistern is delivered through the said receiver.

This apparatus is intended to be fixed more especially in dwelling-houses, over or in connexion with sinks, water-closets, wash-hand basins, urinals, and also in courts and alleys, and similar places, or it may be attached to any stand-post or formed thereon.

2951.—GEORGE ANDREW MIDDLEMISS, of Sunderland, in the co. of Durham, architect, for "*An improvement in withdrawing water or other fluids in as pure a condition as possible from wells, cisterns, and other places where the water or other fluid is mixed with foreign matter; also to prevent the choking up of the pumps and other instruments usually used for drawing off water and other fluids.*" Patent dated Oct. 11, 1869.

This improvement consists in fitting a nozzle on the end of a flexible pipe or tube. The nozzle or the tube is provided with a float to keep the nozzle a distance below the surface of the water or other fluid in which it is immersed, and with which it rises and falls. The other end of the pipe or tube is in connexion with the outflow-pipe leading from the cistern or tank, or if the flexible tube and nozzle are fitted in a well, the other end of it is secured to the suction-tube of a pump, by which the fluid is lifted. The flexible tube may be composed of vulcanized rubber or other material, or of pipes jointed to one another, so that they rise and fall with the fluid. The nozzle may be provided with a grating or a straining medium, concave or otherwise, to prevent any impurities or bodies passing into the outflow-pipe.

2959.—EVERETT AUSTIN SNUGGS, of 26, Sheet Street, Windsor, in the co. of Berks, for "*Improvements in cocks, taps, and valves.*" Patent dated Oct. 12, 1869.

According to this invention the plug and plugway are made cylindrical, and the former is fitted so as to rise and fall or slide in the latter by means of a lever or screw, or both combined. The improved plug is formed by placing a number of circular discs or cups of leather, or india-rubber, cork, or other suitable material, upon a spindle or stem made with a flange or collar near the top, and fitted with a screw collar or washer and nut at the bottom, between which fixed and moveable collars the said discs or cups are placed, and screwed up with their flat or cup surfaces in contact with each other, so as to form a solid cylindrical plug of the required length.

2972.—LOUIS MARINO CASELLA, of Hatton Garden, in the co. of Middlesex, for "*An improved apparatus to be employed in lighting gas-burners, lamps, and other articles.*" Patent dated Oct. 13, 1869.

This improved apparatus consists of a reservoir for spirits of wine, of suitable capacity and of such shape as to stand on a table or other surface. The top of the reservoir is provided with an aperture through which it is filled with the spirits. A verticle tube or nipple, from two to six inches or more in length, screws or fits into this aperture, and a wick is passed through the tube so as to dip into the spirits. The spirits rise by capillary attraction to the top of the wick, which is lighted when the apparatus is required for use. The apparatus is provided with a thimble or cap to be placed on the top of the tube in order to extinguish the light, and to prevent evaporation of the spirit when the apparatus is not in use. The thimble is connected to the apparatus by a chain.

2975.—RICHARD SCHOLEFIELD, of Leeds, in the co. of York, engineer, for "*Improvements in pumps or apparatus for raising or forcing water or other liquids or fluids, and for transmitting the motive power thereof.*" Patent dated Oct. 13, 1869.

This improved apparatus consists of a casing or cylinder formed of two or more cures or different radiuses, that is, having one portion of its circumference at a greater distance from the centre or axis than the other, yet each opposite side being connected and having inlet and outlet passages thereto. Within this casing or cylinder is a rotary shaft passing through a stuffing box in one end, and supported in a bearing in the other end, which may also be a stuffing box.

3008.—JAMES WALKER, of Glasgow, in the co. of Lanark, N.B., engineer, for "*Improvements in apparatus for measuring fluids.*" Provisional protection only obtained. Dated Oct. 15, 1869.

These improvements comprise an apparatus having a cylinder or other conveniently shaped vessel with a piston reciprocating inside it, but not necessarily attached to any piston-rod. The piston has on each side of it one or more levers, and on the piston approaching either end of its stroke one end of each lever comes in contact with the end of the cylinder, which causes the opposite end of the lever to advance with a quieter motion than that of the piston, and push out a rod passing out through a stuffing-box. The rod acts on a lever outside at a point near its fulcrum, and this lever acts with a point farther from its fulcrum on a second longer lever.

3012.—WILLIAM BRADSHAW LEACHMAN, of Leeds, in the co. of York, engineer, and JOHN HOLROYD, of Leeds aforesaid, for "*Improvements in hydraulic apparatus for raising and forcing water.*" Provisional protection only obtained. Dated Oct. 15, 1869.

In carrying out these improvements a double-action force-pump, consisting of a cylinder provided with inlet and outlet valves is mounted between two hydraulic cylinders or rams. The piston-rod of the pump passes through the ends of the pump-cylinder, and is made of such a length that the ends of the said rod constitute the plungers of the rams. Inlet and discharge pipes of the required length are bolted to the pump-cylinder below the inlet-valves and above the outlet-valves respectively, and a pipe of small diameter, and of the required length, is bolted to each of the rams to supply them with water.

3036.—ASTLEY PASTON PRICE, of 47, Lincoln's Inn Fields, in the co. of Middlesex, consulting chemist, for "*Improvements in the purification of coal gas.*" A communication. Patent dated Oct. 18, 1869.

This invention relates to an improved method of effecting the separation of certain impurities, such as ammonia and sulphuretted hydrogen, which are contained in crude and impure coal gas, and consists, first, in the employment of sawdust or other divided porous substance, organic or mineral, in conjunction with sulphuric acid which has been previously diluted with water, together with such substances as are now generally employed for effecting the purification of gas—such, for example, as the oxides of iron, either before or after they have undergone the process of revivification.

In carrying out this invention the sawdust or other porous material may either be first impregnated with the diluted acid, and, after having been dried by exposure or otherwise, may be mixed with other purifying agents, such as oxide of iron or revivified material, or the sawdust or other porous material may be mixed with the oxide of iron or the revivified materials, and then the diluted sulphuric acid be added, and after the materials have, if necessary, been dried by exposure or otherwise they may be placed in what is known as a dry purifier, and the impure gas be conducted through the same, as is well understood. From time to time, as the sulphuric acid becomes saturated with ammonia, it will be found desirable to add additional quantities of the diluted sulphuric acid, which is done either before or after the materials have undergone the process of revivification, as is well understood. The proportions in which it is preferred to employ the diluted sulphuric acid are about two parts by weight of real vitriol to every 100 parts of purifying material or mixture, but other proportions will give good results. The degree or state of dilution of the sulphuric acid which has been found to give good results is about one part by weight of sulphuric acid or vitriol to about five parts by weight of water, but other proportions may be employed.

In carrying out the first part of this invention it is preferred to saturate the mixture of sawdust and oxide of iron with the diluted acid, and then to dry or

desiccate the acidified mixture by exposure to the air or otherwise. The desiccated materials are then placed in an ordinary purifier, and the impure gas is allowed to pass through the same until the sulphuric acid contained therein is saturated. The materials are then to be watered with another portion of the diluted sulphuric acid, and the impure gas is allowed to pass through the same until the acid is neutralized, and this process may be repeated until such time as that the materials shall have become choked or clogged with impurities, such as tarry matter, naphthaline, and other products, or until it is found necessary to submit the contents of the purifier to what is known as a revivifying process—that is to say, exposing the mixture containing the spent oxide of iron to the action of the atmosphere. From the spent or from the revivified material the sulphate of ammonia may be obtained by lixiviating with water and then evaporating, as is well understood. The revivified or the revivified and lixiviated material may be again saturated with dilute acid, dried, and be again employed, as before mentioned. In adopting this method of purification, it will be found that the sulphuretted hydrogen will be readily removed, as well as the ammoniacal impurities, and that naphthaline, should such be contained in the gas, will be separated from the impure gas.

The second part of this invention relates to the employment of sulphuric acid previously diluted with water, in conjunction with oxide of iron or the oxides of iron resulting from the revivification of the before-mentioned purifying agents or materials, by which means their power of effecting the abstraction of ammonia and of sulphuretted hydrogen is increased, and the abstraction of those impurities is more easily effected.

In carrying out the second part of this invention, the oxide of iron intended for the purification of coal gas is treated with diluted sulphuric acid; and after the impure gas has passed through the same, and the acid has become saturated with ammonia, the purifying materials are moistened with diluted acid, and the gas is again to pass through the purifier, which operations may be repeated. When the oxide of iron has ceased to abstract the sulphuretted hydrogen, the material is to be subjected to the revivifying process by exposure to air; and after the extraction of the sulphate of ammonia by lixiviation with water, the residual oxide of iron may be again submitted to the treatment with diluted sulphuric acid, as before mentioned. The sulphate of ammonia formed by the abstraction of the ammonia, and contained in the purifying materials, may be extracted by means of water, as is well understood.

3045.—ALBERT EVANS, of Grimsbury, in the co. of Northampton, horticultural engineer and hot water apparatus maker, for "*An improved method of joining or connecting pipes and tubes.*" Provisional protection only obtained. Dated Oct. 19, 1869.

According to this invention, at each end of the pipes or tubes to be joined or connected is placed a triangular flange, the same being grooved or otherwise, and which flanges are forged or shrunk on the pipes or tubes to which they are applied. In order to join or connect the pipes or tubes, a gasket or other packing is placed between the flange faces thereof, and which are then drawn together by means of two or more clips, constructed either of wrought or cast iron, brass, or other suitable metal, and with concave triangular channels therein. The clips are drawn into position by iron or other bolts.

3085.—FRANCIS SKELLY ANDERSON, of New Orleans, state of Louisiana, U.S.A., at present residing at 42, Cannon Street, in the City of London, for "*Improvements in obtaining fuel and light from water.*" Provisional protection only obtained. Dated Oct. 23, 1869.

These improvements consist in treating heated, but not boiling water, which may be either fresh or salt, with sulphuric ether combined with a solution of zinc in such a manner as to separate the oxygen from the hydrogen. The hydrogen so obtained is treated with a solution of sulphuric acid, and also with hydro-cyanic acid, for the purpose of consolidating the hydrogen gas.

APPLICATIONS FOR LETTERS PATENT.

2784.—WILLIAM FLETCHER, of Ilkeston, in the co. of Derby, chemist and druggist, for "*Improvements in apparatus for measuring liquids.*" Oct. 22, 1870.

2786.—THOMAS SCHOENBERGER BLAIR, of Pittsburg, Pennsylvania, U.S.A., but at present residing at Swansea, in the co. of Glamorgan, for "*Improvements in spiral pumps, and in apparatus employed in connexion therewith.*" Oct. 22, 1870.

2826.—WILLIAM ROSS, of Glasgow, in the co. of Lanark, N.B., brassfounder, for "*Improvements in and relating to ball-valves and floats.*" Oct. 27, 1870.

2832.—WILLIAM FROST SWEETLAND, of Hendon, and JOHN MERFIELD, of 216, Goswell Road, Islington, both in the co. of Middlesex, for "*Improvements in apparatus for purifying sewage.*" Oct. 27, 1870.

2838.—JOSEPH JUDGE HAYS, of Hertingforbury, in the co. of Hertford, for "*Improvements in treating and deodorizing sewage.*" Oct. 28, 1870.

2846.—ALFRED LONG, of 22, Aylesbury Street, Walworth, in the co. of Surrey, for "*Improvements in apparatus for controlling the passage of water or other fluids.*" Oct. 29, 1870.

2857.—THOMAS SCHOENBERGER BLAIR, of Pittsburg, Pennsylvania, U.S.A., but at present residing at Swansea, in the co. of Glamorgan, for "*Improvements in spiral pumps.*" Oct. 31, 1870.

2865.—ALEXANDER HORACE BRANDON, of 5, Quai de Paris, Rouen, in the empire of France, civil engineer, for "*Improvements in the means or apparatus for producing the more complete combustion of gas, paraffin, and other hydrocarbon oils.*" A communication. Oct. 31, 1870.

2872.—ALBERT MARCIUS SILBER, of the firm of Silber and Fleming, of Wood Street, Cheapside, in the City of London, merchants, and FREDERICK WHITE, of Camberwell, in the co. of Surrey, watchmaker, for "*Improvements in apparatus for lighting.*" Nov. 1, 1870.

2903.—JOSEPH BREEDEN, of the firm of J. and W. Breeden and Booth, of Birmingham, in the co. of Warwick, manufacturers, for "*Improvements in self-closing taps or valves.*" Nov. 3, 1870.

GRANTS OF PROVISIONAL PROTECTION.

2361.—EDMUND CHIVERTON, of Orient Cottage, Middle Street, Southsea, in the co. of Hants, for "*Improved means of and apparatus for lighting gas-lamps.*" Aug. 29, 1870.

2653.—CHARLES FELTON KIRKMAN, of High Street, Islington, in the co. of Middlesex, gentleman, for "*Improvements in treating sewage, and in the apparatus and means employed therein.*" Oct. 6, 1870.

2710.—JAMES BAIN, of Liverpool, in the co. of Lancaster, engineer, for "*Improvements in double-acting pumps.*" Oct. 14, 1870.

2730.—JOHN STALVIES, of Bromsgrove, in the co. of Worcester, locomotive superintendent, for "*Improvements in gas-stoves for heating and warming rooms, and for other like purposes.*" Oct. 17, 1870.

2786.—THOMAS SCHOENBERGER BLAIR, of Pittsburg, Pennsylvania, U.S.A., but at present residing at Swansea, in the co. of Glamorgan, for "*Improvements in spiral pumps, and in apparatus employed in connexion therewith.*" Oct. 22, 1870.

2826.—WILLIAM ROSS, of Glasgow, in the co. of Lanark, N.B., brassfounder, for "*Improvements in and relating to ball-valves and floats.*" Oct. 27, 1870.

2832.—WILLIAM FROST SWEETLAND, of Hendon, and JOHN MERFIELD, of 216, Goswell Road, Islington, both in the co. of Middlesex, for "*Improvements in apparatus for purifying sewage.*" Oct. 27, 1870.

NOTICES TO PROCEED.

1706.—BEVAN GEORGE SLOPER, of Northfleet, in the co. of Kent, for "*Improvements in the treatment of sewage.*" June 14, 1870.

2047.—JOHN HUGHES LLOYD, M.D., of Llangefni, in the co. of Anglesey, North Wales, for "*Improvements in utilizing and deodorizing sewage matters of dwelling-houses and other places, and in apparatus to be used in connexion with the same.*" July 20, 1870.

2200.—JAMES GARTH MARSHALL, of Holbeck, in the parish of Leeds, in the co. of York, flax spinner, for "*Improvements in ventilation and in the purification of air.*" Aug. 8, 1870.

2275.—ALFRED WILLMER POCOCK, of Pimlico, in the co. of Middlesex, engineer, for "*Improvements in meters for measuring water and other liquids.*" Aug. 17, 1870.

2297.—JOSEPH JUDGE HAYS, of Hertingforbury, in the co. of Hertford, gentleman, for "*Improvements in purifying, deodorizing, and utilizing sewage and other refuse and deleterious matters, and for machinery therein employed.*" Aug. 20, 1870.

2437.—GEORGE HENRY ELLIS, of 20, High Holborn, in the co. of Middlesex, engineer, for "*Improvements in steam, gas, and air engines.*" Sept. 9, 1870.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2925.—EDWARD CASPER, "*An improved mode of and means for preventing the bursting of the tubes in steam and water pressure-gauges, and other tubes or pipes, from the effects of cold.*" Oct. 18, 1867.

2931.—HENRY JOHN BALE, "*Improvements in apparatus to be used in cooking by means of gas.*" Oct. 18, 1867.

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£		£ s. d.	£ s. d.	£
8000	10	Anglo-Romano	10 0 0	10 0 0	11 — 12
5000	20	Bahia (Limited)	20 0 0	3 0 0	13 — 14
1000	20	Do., preference	20 0 0	10 0 0	25 — 26
750	20	Do., do., redeemable	20 0 0	10 0 0	20 — 22
40000	5	Bombay (Limited)	5 0 0	4 10 0	6 — 6¼
10000	5	Do., third issue	4 0 0	4 10 0	5 — 5¼
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbdge., & Holywll.)	20 0 0	10 0 0	30 — 31
7500	20	Cagliari (Limited)	20 0 0	7 0 0	
112000	10	*Chartered*	10 0 0	9 0 0	14 — 15
8000	10	Do., A shares	5 0 0	9 0 0	6¼— 6¾
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	6¾— 7¼
25000	10	Do., 5 per cent. preference	7 0 0	5 0 0	9 — 9½
20000	10	Do., 10 per cent. preference	10 0 0	10 0 0	19 — 20
17490	25	*Commercial*	25 0 0	10 0 0	41 — 43
20000	20	Continental Union	20 0 0	8 0 0	25 — 26
10000	20	Do., new	5 0 0	8 0 0	7¾— 8¼
5213	20	Do., preference (France: Strasbg., Cette, Nismes, Montargis, Vienne, Roanne, Beaucaire, Rueil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	24 — 26
5000	10	*Crystal Palace District*	10 0 0	10 0 0	16 — 16½
5000	10	Do., preference	10 0 0	6 0 0	11 — 11¼
10000	10	Do., new shares	10 0 0	7 0 0	12 — 12½
4000	50	*Equitable*	50 0 0	10 0 0	80 — 83
4000	25	Do., new shares	25 0 0	10 0 0	40 — 41½
23406	10	European (Limited)	10 0 0	11 0 0	15¼— 16
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	11 0 0	8 — 8¼
5000	10	Hong Kong (Limited)	10 0 0	9 0 0	11 — 12
26000	50	*Imperial*	50 0 0	10 0 0	84 — 85
26000	10	Do., new shares	7 0 0	10 0 0	12 — 12½
26000	12½	Do., new shares	12 10 0	7 0 0	14¼— 15¼
25000	12½	Do., new shares, 1870	2 10 0	7 0 0	3¾— 4
1300	100	Do., bonds	£100	10 0 0	175 —180
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	66 — 68
400	100	Imperial Mexican (Limited)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	64 — 65
3000	10	Do.	10 0 0	5 0 0	7 — 8
3000	20	Do.	15 0 0	7 10 0	17 — 18
7133	50	*London*	50 0 0	10 0 0	84 — 86
5610	25	Do., 1st preference	25 0 0	6 0 0	27 — 29
503	50	Do., 2nd preference	50 0 0	6 0 0	
214	50	Do., 3rd preference	50 0 0	6 0 0	
£18781		Do., 1st preference stock		6 0 0	
£11828		Do., 2nd preference stock		5 0 0	
15000	5	Nictheroy, Brazil (Limited)	5 0 0	4 10 0	3½— 4
6000	5	Malta and Mediterranean (Limited)	5 0 0	7 0 0	4½— 5¼
20000	5	Do., preference	1 0 0		1 — 1¼
30000	5	Mauritius (Limited)	5 0 0	10 0 0	8 — 8½
30000	5	Oriental (Calcutta)	1 10 0	10 0 0	3¼— 3½
10000	5	Do., new shares	5 0 0	nil.	2 — 2¼
14000	10	Ottoman (Limited)	10 0 0	10 0 0	10 — 11
27000	20	Parà (Limited)	20 0 0	10 0 0	33 — 35
3600	100	*Phœnix*	40 0 0	7 10 0	46 — 47
144000	Sk.	Do., new	100 0 0	5 0 0	85 — 90
5000	20	Do.	20 0 0	10 0 0	28 — 29
	20	*Ratcliff*	20 0 0	10 0 0	28 — 29
6959	5	Rio de Janeiro (Limited)	5 0 0	7 0 0	
2000	5	Singapore (Limited)	5 0 0	7 10 0	
1500	32½	Do., preference	32 10 0	12 0 0	
4000	50	Shanghai	50 0 0	10 0 0	87 — 90
4000	12½	*South Metropolitan*	12 10 0	10 0 0	21½— 22
20000	12½	Do.	2 10 0	10 0 0	6 — 6½
15000	10	Do., new shares	10 0 0	10 0 0	15¼— 16¼
10000	10	*Surrey Consumers*	6 0 0	10 0 0	10 — 11
9000	4	Do., new	4 0 0	5 0 0	2¼— 2¾
1500	10	United General (Limerick)	10 0 0	10 0 0	10 — 12
1500	10	*Wandsworth and Putney*	10 0 0	7 10 0	
1819	10	Do.	10 0 0	7 10 0	
1138	10	Do.	10 0 0	7 10 0	
20000	10	Western (Limited) A shares	5 0 0	10 0 0	16 — 17
10000	10	Do., B shares	10 0 0	10 0 0	14¼— 15
10000	10	Do., C shares	8 0 0	10 0 0	13 — 13¼
20000	10	Do., D shares	1 0 0	10 0 0	2½— 3
16000	5	*West Ham*	5 0 0	7 10 0	7 — 7¼
551	10	West London Junction (Limited)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1 in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle and Middlesboro'.	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 15 0	2 12 3	2 9 6	3 10 0	3 15 0
1½ and 2-inch Socket-pipes	7 0 0	5 15 0	5 10 0	6 0 0	7 0 0
2½ and 3-inch ditto	6 10 0	5 5 0	5 0 0	5 15 0	6 10 0
4 and 5-inch ditto	6 0 0	4 15 0	4 10 0	5 5 0	6 0 0
6 inches and upwards ditto	5 15 0	4 5 0	4 0 0	5 0 0	5 15 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 5 0	5 0 0	5 10 0
Ditto, 2nd ditto, cold ditto	6 10 0	—	—	—	6 10 0
Tank-plates, ¼ thick and above	6 0 0	5 0 0	4 15 0	5 10 0	6 0 0

WROUGHT-IRON TUBING,

Subject to 60 per cent. Discount.

	2 in.	1¼ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 14 feet—per foot	1 8	1 1	0 10	0 7	0 5	0 4½
Ditto ditto, from 12 in. to 23½ in.—each	3 0	2 0	1 6	1 1	0 9	0 8
Long Screws, from 13 in. upwards	4 0	2 3	2 0	1 6	1 2	0 11
Bends and Springs	4 3	2 3	1 9	1 3	0 11	0 8
Square Elbows, equal or reducing; Round Elbows, 5 per cent. extra	3 9	2 3	1 9	1 3	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 9
Crosses, ditto, equal or reducing	4 9	3 6	3 0	2 3	1 9	1 6
Iron Cocks	20 9	13 0	10 9	7 3	5 0	3 8
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4½
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.

Newcastle—Unscreened:—	Per Ton.
	6s. 6d.
Haswells, Nettlesworth Primrose, and South Pelaw	
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	15 0
Wigan Cannel (at Liverpool)	17 0
Welsh Cannel:—	
Coppa Cannel (on rails at Birkenhead), 13s. 6d.; ditto (on rails at Connah's Quay)	13 0

Scotch Cannel, f.o.b.:—	Per Ton.	*Scotch Cannel*, f.o.b.:—	Per Ton.
Boghead—at Bo'ness, 47s. 6d.; at Leith	48s. 2d	Arniston (at Leith)	21s. 0d
Muirkirk	27 0	Wemyss (at Wemyss)	20 0
Kirkness, best (at Burntisland)	22 6	Haywood Co.'s Haywood (at Granton)	20 0
Capeldrae, 1st quality (at ditto)	22 6	Pirnie, or Methill	17 0
Ditto, 2nd ditto (at ditto)	17 6	Lothian's Cannel (at Leith)	24 6
Cowdenbeath (at ditto)	12 0	Grange ditto (at Bridgeness)	17 6
Lochgelly (at ditto)	12 0	Kinniel ditto (at Bo'ness)	17 6
Donnibristle—at Burntisland, 12s.; at Aberdour	12 6	Myles' ditto	23 6
Auchinheath Lesmahago (at Granton)	27 0	Lochore Parrot (at Burntisland)	22 6
Duke of Hamilton's Lesmahago (at Granton)	27 0	Lanemark (at Glasgow)	16 0
		Elphinstone Tower (at Leith)	20 0

SUNDRIES.

Best Newcastle Fire-bricks, per 1000	£2 10s. to £2 15s. 0d.
Cliff's Fire-bricks (at Wortley), per 1000	2 15 6
Ingham's ditto (at Wortley), per 1000	2 15 0
Farnley Iron Co.'s Fire-bricks (at Wortley), less discount	2 17 0
Fire-clay Retorts, per foot run	5s. 6d. to 0 7 6
Tarred Rope Yarn, per cwt.	1 0 0

FREIGHTS.

Coastwise—Newcastle:—	Per Ton.	*Foreign:—*	Per Keel.
Chatham and Rochester	6s. 6d	Barcelona	£19 10s
Cork	—	Bordeaux	10 0
Dover, Folkestone, and Ramsgate	6 9	Boulogne and Calais	8 10
Dublin	8 6	Cadiz	12 0
Exeter Quay	8 0	Cronstadt	—
Ipswich	6 0	Copenhagen	9 5
London (from Leith)	8 6	Genoa	15 10
London (Pool)	6 6	Hamburg	10 10
Lowestoft and Yarmouth	5 0	Havre de Grace	10 0
Portsmouth & Southampton	7 6	Leghorn	16 10
Plymouth	8 6	Lisbon	10 10
Shoreham	7 6	Rotterdam	—
Whitstable	6 9	Stettin	14 0
Weymouth	7 6	Trieste	16 0
		Venice	18 10

THE

DUKE OF HAMILTON'S

LESMAHAGOW

CANNEL COAL.

LESSEES:

THE NITSHILL & LESMAHAGOW COAL COMPANY.

OFFICE:

37, ST. VINCENT PLACE,

GLASGOW,

Where all communications are requested to be addressed.

SEWAGE IRRIGATION.

Just published, price 2s., by post 2s. 1d.,

REPORT OF PROCEEDINGS

IN

PARLIAMENT

(SESSION 1870)

ON THE

BLACKBURN CORPORATION

IMPROVEMENT BILL.

LONDON:

WM. B. KING, 11, BOLT COURT, FLEET STREET, E.C.

LAMBERT BROTHERS, WALSALL.

ALPHA TUBE & FITTING WORKS

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

As Trustees of the late ORLANDO BROTHERS, we most respectfully announce that we intend to continue the above business, under the name of ORLANDO BROTHERS, in which name all communications must be addressed.

We trust that we shall receive a continuance of the same support which was given to our late father.

We are, yours most respectfully,

ORLANDO BROTHERS.
FRANCIS W. BROTHERS.
COLIN BROTHERS.

JOHN WRIGHT & CO.,

30, BROAD STREET, ISLINGTON, BIRMINGHAM.

WRIGHT'S IMPROVED SQUARE GAS COOKING STOVES.

SQUARE COOKING STOVE, No. 65,

With Cast-Iron Top and Bottom, Door and Frame.

14 in. square, with small Boiling Stove on top	£3 10 0
16 in. square, with one large Boiling and Broiling Stove on top	4 5 0
18 in. square, with two small Boiling Stoves, and one large Boiling and Broiling Stove on top (as drawing)	5 5 0
24 in square, with two folding doors; two small Boiling Stoves, and one large Boiling and Broiling Stove on top	7 10 0

WRIGHT'S IMPROVED IRONING STOVE

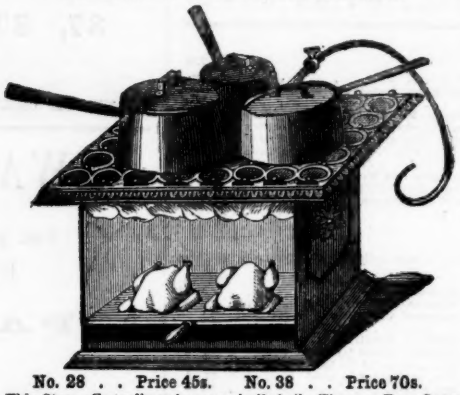
Will heat Three Flat Irons at one time. It is also well adapted for Hatters' Irons.

Price 10s. 6d.

12 ft. of prepared Tube for ditto, 4s.
Cock and Nozzle for ditto, 1s. 6d.

WRIGHT'S IMPROVED GAS COOKER,

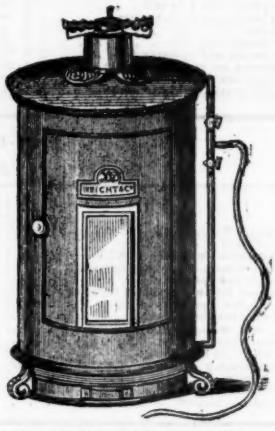
FOR BOILING, BROILING, AND TOASTING.



No. 28 . . Price 45s. No. 38 . . Price 70s.

This Stove effectually and economically boils Three or Four Saucepans, and cooks (by reflection) Chops, Steaks, a small Joint, or pair of Fowls. It also makes Toast, and acts very nicely as a Salamander.

WRIGHT'S IMPROVED ROUND GAS COOKING STOVES.



ROUND COOKING STOVE, No. 68,

With Cast-Iron Top and Bottom and Glass Door.

11 in. diameter	£1 15 0
14 in. diameter	2 2 0
16 in. diameter	2 12 6
18 in. diameter	3 3 0

All the Boiling and Broiling Stoves are Atmospheric.

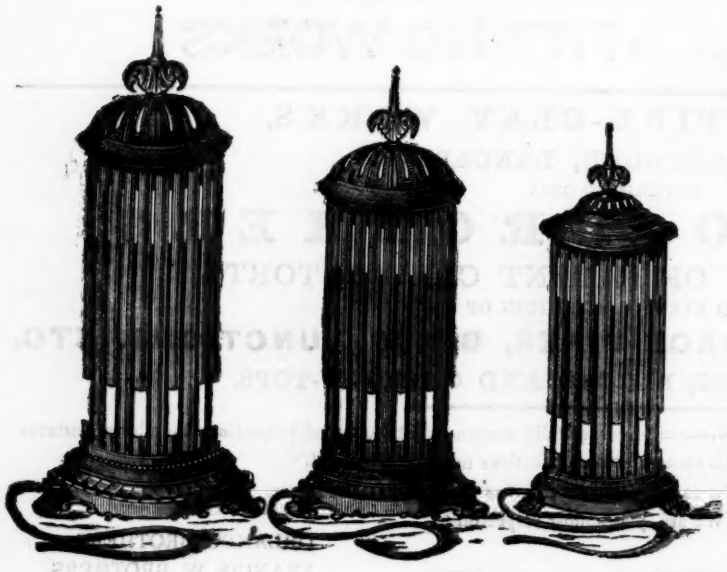
For Roasting, Broiling, Frying, Baking, Boiling, Stewing, or Preserving, either together or separately.

The advantages of Gas Cooking are—Its portability and cleanliness; perfect and immediate control over the heat; it requires but little attention; there is no roasting or baking fire to make up; it is always ready; it keeps the kitchen and house cool; it is economical, even where dear; and it is only alight while actually in use.

THIS REGISTERED

RADIATING GAS-STOVE

Was experimented upon, and recommended by Sir HENRY HOLLAND, Bart., Physician to the Queen, at Hull, in his Lecture on the Uses of Gas.



It is constructed on scientific principles, and gives out great heat by the perfect combustion of a small quantity of gas, avoiding both smell and smoke.

It can be fixed in any room by drawing the flexible tube over the gas-nipple of an ordinary burner, which supplies sufficient gas for the smaller size.

The following are distinguishing advantages of this Stove:—

It is portable; it is ornamental and effective; it is cheap, both in first cost and in daily use; it requires scarcely any fixing; and there is **positively no smell.**

PRICES:

No. 210 Stove, 21 in. high	12s. 6d.
,, 212 do., 26 in. ,,	17 6
,, 214 do., 32 in. ,,	25 0
12 feet of prepared Tube for ditto	4 0
Cock and Nozzle for ditto	1 6
No. 216 Stove, 40 in. high	42 0
,, 218 do., 48 in. ,,	63 0
12 feet of prepared Tube for ditto	6 0
Cock and Nozzle for ditto	2 6

Trade Discount 32½ per cent.

JOHN WRIGHT & CO.,

30, BROAD STREET, ISLINGTON, BIRMINGHAM.

WRIGHT & CO.'S HOT WATER APPARATUS & GAS BOILER,

FOR

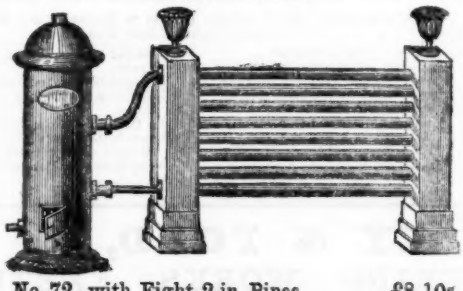
Heating Conservatories, Vineries, Propagating-Houses, Counting-Houses, Halls, Shops, Harness-Rooms, and small Places of Worship, &c.

THEY HAVE THE FOLLOWING ADVANTAGES:—

They require no setting in brickwork, and can easily be applied to hot-water pipes already in use, without disturbing any existing Boiler.
Require no attention after once lighting, and will keep up one uniform temperature.
Save the gardener's time superintending the ordinary furnace.
Are especially adapted for small conservatories where a gardener is not kept.
Occupy a small space, and can be fixed inside or outside a greenhouse.
No collection of soot caused by burning, as the flame is smokeless.

GAS HOT WATER APPARATUS, COMPLETE, requiring no Supply Cistern and little or no fixing.

Made in Two Sizes.

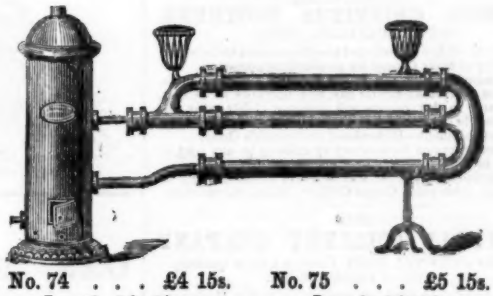


No. 72, with Eight 2-in. Pipes . . . £8 10s.
Length 4 ft. 9 in.

No. 73, with Eight 2-in. Pipes . . . £10 0s.
Length, 7 ft. 9 in.

Nos. 72 and 73 can also be had with a double row of four pipes, instead of a single row of eight, at the same price.

Made in Two Sizes.



No. 74 . . . £4 15s. Length, 5 ft. 3 in.

No. 75 . . . £5 15s. Length, 8 ft. 3 in.

This APPARATUS COMPLETE, with Supply Cistern and Air-Pipe, is adapted for Coach-Houses, and Harness-Rooms, &c.; keeps the carriage and cushions well aired, and quickly dries horse-clothing, if thrown over the pipes.

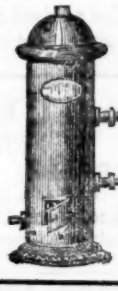
WRIGHT & CO.'S GAS BOILER ONLY.

(Made in Three Sizes.)

No. 1 . . . . . 45s.
Length of 2-in. Pipe it will heat, 20 to 30 ft.

No. 2 . . . . . 85s.
Will heat 60 ft. of Pipe.

No. 3 . . . . . £5 10s.
Will heat 150 ft. of Pipe.



The Boiler may, if preferred, be placed outside or underneath the conservatory or hall, and the connecting-pipes be lengthened for the purpose. In all cases where there is likely to be a down draught, this plan is strongly recommended.

The above compact and useful apparatus supply a want long felt for heating small conservatories, as they save the expense of having hot-water pipes fixed in the usual way, and will keep up one uniform heat at a trifling expense, and no trouble, as, after once lighting, a pint of water put in once a week is all that s required.

The combustion is so perfect that, except for conservatories, no pipe is necessary to carry off its products.

WRIGHT & CO.'S TERRA COTTA STOVES.

BEE HIVE.

These Stoves are fitted with Wright's Improved Bunsen's Burners, and throw out more heat than any other Terra Cotta Stoves that have yet been introduced.

No 83 . . . . . Price 25s. each.
,, 85 . . . . . ,, 35s. ,,
,, 87 . . . . . ,, 45s. ,,
Cock and Nozzle for ditto, 1s. 6d.
12 ft. prepared Tube for ditto, 4s.

GRECIAN.

No. 96 . . . . . Price 45s. each.

WRIGHT'S IMPROVED TERRA COTTA STOVES.

14 in. diameter, 22 in. high.

No. 600, not Illuminated. Price 16s.
,, 601, Illuminated . . ,, 21s.

This Stove has an Iron Bottom and Terra Cotta Top. The bottom contains a well, which should be filled daily with water.

No. 601 is illuminated with Ruby Glass Panels, and has a most cheerful appearance when alight.

Neither No. 600 nor 601 has atmospheric burners.

Trade Discount 32½ per cent.

CANNEL COAL.—The West Yorkshire Iron and Coal Company, Limited, beg to draw the attention of Gas Companies to their Cannel, of which the following is the analysis made by W. Huggon, Esq., F.C.S.:

Yield of gas per ton	10,296 cubic feet.
Illuminating power rather over	21 sperm candles.
Yield of coke per ton	12 cwt.

The actual working, as reported by one of the largest gas companies in Yorkshire, gives results still more favourable, viz.—

Yield of gas	10,416 cubic feet.
Illuminating power	21·89 sperm candles.
Coke	The same.

We add from the same source the capabilities of the common gas coal—

Yield of gas	10,080 cubic feet.
Illuminating power	14·41 sperm candles.
Yield of coke	13 cwt.

COLLIERIES—WEST ARDSLEY, near LEEDS.

For further particulars, address to the Office of the Company, 15, York Place, LEEDS.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles.*

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near LEEDS.

OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

Analysis and price on application to Mr. WM. CAREY, Manager, Wemyss Colliery, Kirkcaldy, FIFE.

CANNEL COAL.

MESSRS. GRIFFITHS BROTHERS,
COPPA COLLIERY, MOLD,

Beg leave to call the attention of Gas Companies to the superior quality of their Cannel for gas-making purposes.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to GRIFFITHS BROTHERS, Coppa Colliery, Mold, FLINTSHIRE.

THE
HUCKNALL COLLIERY COMPANY
Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the HUCKNALL COLLIERY COMPANY, Hucknall Torkard Collieries, near NOTTINGHAM.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, E.C., and 133, Regent Street, LONDON. Agents wanted.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

FIRE-CLAY GAS-RETORTS, &c., CANNEL AND STEAM COALS.

WILLIAM FRASER, Inverkeithing (owner of the Works at which Fire-Clay Retorts were first made), having greatly enlarged his Works, can supply RETORTS and other FIRE-CLAY GOODS to any extent.

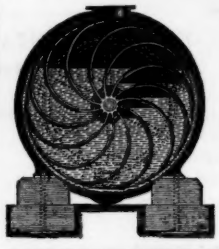
References can be given to managers of above a hundred Gas-Works whom he supplies.

WILLIAM FRASER ships COWDENBEATH PARROT COALS at Charlestown and Burntisland at 11s. per ton; and HALBEATH STEAM COALS, on Navy List, at 7s. per ton.

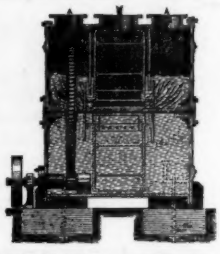
INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

J. T. B. PORTER & CO.,
GAS ENGINEERS,
MANUFACTURERS AND CONTRACTORS FOR GAS-WORKS
Of any extent at Home and Abroad,
GOWTS BRIDGE WORKS, LINCOLN,
AND
JOHN STREET, ADELPHI, LONDON, W.C.

WALTER FORD,
159, GRAY'S INN ROAD, LONDON,
MANUFACTURER OF
WET & DRY GAS-METERS, STATION-METERS, GOVERNORS, &c.
SOLE MANUFACTURER OF
PADDON'S PATENT STREET-LAMP REGULATORS,
For ensuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.



HANNA DONALD & WILSON
GAS ENGINEERS,
ABBEY WORKS, PAISLEY.
LONDON OFFICE:
9, FENCHURCH STREET, E.C.
MAKERS OF
WHIMSTER'S PATENT COMBINED GAS EXHAUSTING & WASHING MACHINE.
Information and prices on application.



ROBERT DEMPSTER,
Gas Engineer and Contractor, Rose Mount Foundry, Elland, near Halifax.

R. D. recommends his Fire-Brick Retorts to Engineers and Managers of Gas Companies; they last from 10 to 12 years.

Iron and Fire-Clay Retorts.
Annular and Pipe Condensers.
Scrubbers and Purifiers, all sizes.
Steam-Engines and Exhausters.
Hydraulic Centre-Valves.
Station-eMters and Governors.
Photometers & Pressure-Gauges.
Lamp-Posts and Brackets.
Cast-Iron Mains and Syphons.
Wrought-Iron Tubes, Water Tanks.
Wrought-Iron & Cast-Iron Roofs.
Gasholders, Single-Lift or Telescopic.
Gas Castings of every description.
Retort Setters and Fitters sent to all parts of the country.
Wood Sieves for Purifiers.

Plans and Specifications prepared.

WILLEY & FORD,
GAS ENGINEERING WORKS, EXETER,
CONTRACTORS FOR THE ERECTION OF GAS-WORKS,
MANUFACTURERS OF IMPROVED WET & DRY METERS;
Also, EVERY DESCRIPTION OF GAS APPARATUS,
Comprising GASHOLDERS, STATION-METERS, GOVERNORS, CONDENSERS, PURIFIERS, RETORTS, SLIDE-VALVES, and every article appertaining to Gas-Works.
Gas Companies advised on Improvements, Extensions, and Alteration of Works.
*** The very best material and workmanship guaranteed, and at prices bearing a favourable comparison with any House in the Kingdom.

SAMUEL CUTLER & SON,
CONTRACTING GAS ENGINEERS, &c.
MANUFACTURERS OF GASHOLDERS, TANKS, PURIFIERS,
AND ALL DESCRIPTIONS OF GAS-MAKING APPARATUS.
Iron Roofs, and General Iron Work. Mains Supplied and Laid.
S. C. & SON supply every requirement for a Gas-Work, and keep in stock Retort-Lids, Cotters, Barrows, Scoops, Bolts and Nuts, &c., &c.

PROVIDENCE IRON-WORKS, MILLWALL, LONDON, E.

TO GAS COMPANIES AND THE TRADE.
J. DEFRIES & SONS,
MANUFACTURERS OF
CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, AND THE PATENT CRYSTAL ILLUMINATION;
Vestibules, Iron Barrel, Composition Tubing, Dry & Wet Meters, & Gas-Fittings
OF EVERY DESCRIPTION.
WORKS: LONDON, BIRMINGHAM, & PARIS.
REGISTERED DESIGNS.

Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music Halls, and Public or Private Buildings with Gas.

GAS MOONS of the newest designs.

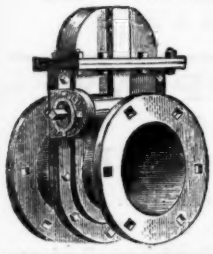
The Patent Gas-Regulator and Purifier reduced to 6s. 6d. per Doz.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1870, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.
ESTABLISHED 1803.

REDUCED PRICES
OF
B. DONKIN & CO.'S
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS,

From 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter.



List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO,
SCREW WATER-VALVES WITH GUN-METAL FACES.

B. DONKIN & CO.,
GENERAL ENGINEERS AND IRONFOUNDERS,
MAKERS OF STEAM-ENGINES,
BERMONDSEY, LONDON, S.E.

A. C. FRASER, F.S.A.,
GAS AND CONSULTING ENGINEER,
COLCHESTER, ESSEX,
INVENTOR & PATENTEE of CAST-IRON & FIRE-CLAY RIBBED RETORTS.

Mr. Fraser having had more than Twenty years experience in the Construction, Alteration, and Management of GAS and WATER WORKS, will be happy to furnish information on all matters appertaining thereto.

Plans, Specifications, and Estimates prepared.

F. & C. OSLER,
45, OXFORD STREET, LONDON, W.
MANUFACTORY AND SHOW-ROOMS:
BROAD STREET, BIRMINGHAM.
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,
WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.
TABLE GLASS OF ALL KINDS.
CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

GEORGE ANDERSON,
GAS AND CONSULTING ENGINEER,
19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

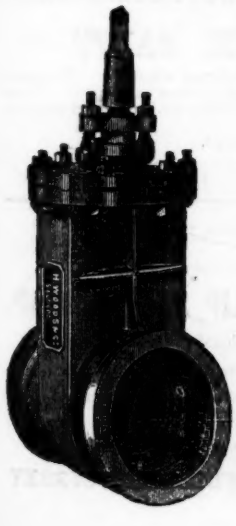
BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

HAMILTON WOODS AND CO.,
LIVER FOUNDRY, SALFORD,
MANUFACTURERS OF
SLUICE-VALVES & HYDRANTS,
As supplied to Water-Works and Local Boards.

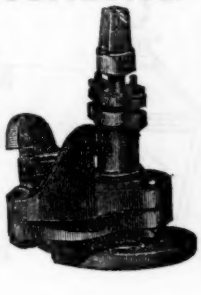


SLUICE-VALVES, from 14s. per inch,
Tight on both Faces, and fitted with Gun-Metal Valve Faces and Seats, and Screws and Nuts.
Every Valve proved to 200 lbs. per square inch.

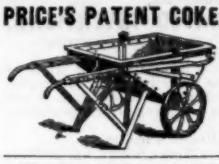
PRICE LISTS ON APPLICATION.

HYDRANTS,
WITH
Gun-Metal Screws,
Valves, and Nuts,
18s. each.

BALL HYDRANTS,
84s. per doz.



PRICE'S PATENT COKE & COAL BARROW,



effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Gas-Works, HAMPTON WICK.

HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 95, CANNON STREET

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 101, Cann Street, E.C.

THOMAS LAMBERT & SONS,
SHORT STREET, LAMBETH, LONDON,

PATENTEES OF THE
HIGH-PRESSURE EQUILIBRIUM BALL VALVES
AND DIAPHRAGM BIB & STOP VALVES,
MANUFACTURER EVERY DESCRIPTION OF
GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.;
WROUGHT-IRON
WELDED TUBE AND FITTINGS,
BLACK AND GALVANIZED;
BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING,
STOCKS, TAPS, AND DIES,
And Every Description of Gas-Fitters Tools;
CAST-IRON GAS-MAIN COCKS,
WITH PATENT METAL PLUGS;
GAS SLIDE AND SLUICE VALVES;
CARTER'S SAFETY GAS-VALVES;
GAS-STOVES, REGULATORS, BURNERS, &c.,
Large Pattern-Book and Price List of Gas-Fittings, price 7s. 6d., supplied on application.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE
FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY,
and every Article suitable for
GAS AND WATER WORKS.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET EDINBURGH.
Established 1840.

ALFRED PENNY, Gas and Consulting ENGINEER,
WENLOCK IRON-WORKS,
21, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, and T-pieces, &c., &c.

Plans, Specifications, and Estimates prepared.

B. CARPENTER'S
IMPROVED
WOOD SIEVES FOR GAS PURIFIERS.
WORKS:
14, JOHN STREET, PENTONVILLE ROAD,
LONDON, N.

The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

Now publishing,

BAILEY'S ILLUSTRATED INVENTIONS,

With Illuminated Cover and over 300 Engravings.

Price 1s.

This book is replete with information, and prices of many well-known as well as perfectly new inventions, interesting to all in the mechanical trades, as well as corporations, governments, gas managers, private gentlemen, and shopkeepers.

Post free in the United Kingdom, 1s.

JOHN BAILEY AND CO., Albion Works, Salford, LANCASHIRE.

TURNER & ALLEN,

201, UPPER THAMES STREET

LONDON, E.C.

MANUFACTURERS OF

LAMP PILLARS,

BRACKETS,

GAS LANTERNS,

FOUNTAINS.

HOT WATER AND GAS ENGINEERS.

Contractors for the supply of Lamp Columns, Lamps, Fountains, &c., to Gas, Water, and Railway Companies, Local Boards, Shippers, &c.

Complete Pattern and Price Book, 3s. 6d. in Stamps.

THOMAS PROUD,

GAS ENGINEER,

Invites attention to his

ALL-PLANED PARALLEL & TAPER BAR

WOOD GRIDS

FOR PURIFIERS,

And respectfully states that he has erected improved Steam Machinery for their manufacture, and devotes great care to manufacture Grids which will give satisfaction both in quality and price.

He also solicits attention to his

IMPROVED GAUGE

which indicates pressure or vacuum in ONE TUBE, the supported or depressed column of water giving the exact reading at a single glance. Mounted on a neat mahogany bracket, and having but one joint, the Gauge can be taken asunder, cleansed, and refixed in a few minutes.

Plans and estimates furnished for improvement of existing, or for the erection of new Gas-Works.

Sole Agent to

GEORGE SKEY & COMPANY,

Limited,

For FIRE-CLAY RETORTS.

Gas Apparatus Manufactory,

7, UNETT ST., ST. GEORGE'S,

BIRMINGHAM.

C. & W. WALKERS'

WOOD SIEVES FOR PURIFIERS.

These justly celebrated Sieves, with bevel bars and hard-wood side frames, have been extensively made by Messrs. Walker for over seven years, and their advantages and durability are fully established. Messrs. Walker make them in very large quantities, having mills and machinery specially laid out for them, producing them at the most moderate cost.

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE.

8, FINSBURY CIRCUS, LONDON, E.C.

HANCOCK'S INDIA-RUBBER GAS-TUBING.

All sizes, from ⅛ in. to 4 in. diameter and upwards.

Also,

HORSE SINGEING APPARATUS, best make, with GAS-BURNERS, COMBS, and INDIA-RUBBER TUBING, all complete.

INDIA-RUBBER BAGS for GAS-MAINS.

WASHERS for GAS and STEAM JOINTS.

VALVES (pure solid Rubber) for STEAM-ENGINES.

PACKING (Elastic) for STEAM-ENGINES.

FLANGE TUBING, for excluding Draughts and Dust through WINDOWS, DOORS, and GLASS CASES.

Section.

Illustrated Price Lists on application.

JAMES LYNE HANCOCK,

Vulcanised India-Rubber Works,

GOSWELL MEWS, AND 266, GOSWELL ROAD, LONDON, E.C.

TO GAS COMPANIES.

Just Published,

THE METER LIFE BOOK;

OR REGISTER AND STOCK-BOOK COMBINED.

A clear, concise, and easy method of keeping a Register or History of any number of Meters.

By ROBERT PEAKE KEYS, ACCOUNTANT and GENERAL AGENT,

26, BUDGE ROW, CANNON STREET,

OVER THE KENT FIRE OFFICES.

(Late of the Firm of Hight & Keys, Accountants & Auditors.)

Specimen Sheets forwarded on receipt of 3s. 6d.

THORNELOE AND COMPANY,

34, LONDON WALL, LONDON, E.C.,

GAS AND WATER ENGINEERS,

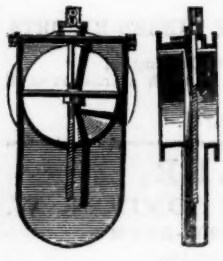
AND

CONTRACTORS FOR GAS AND WATER WORKS APPARATUS.

SHOW-ROOMS AND WHOLESALE WAREHOUSE FOR

Wrought-Iron Tubes & Fittings for Gas, Water, & Steam; Chandeliers, Pendants, Lamps and Brackets, Plumbers Work, Water-Closets, Pumps, &c. Lead, Composition, Brass, and Copper Tubes.

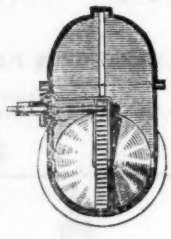
PATENTEES OF THE

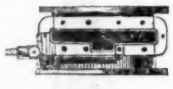


NEW FLEXIBLE VALVE

FOR

GAS & WATER WORKS.





This Valve has been designed to meet what has hitherto been felt a great want, in Gas-Works especially—namely, a *really tight* Valve which could be depended upon.

The new Valve is simple in construction, not liable to get out of order, cheap in price, and the principle can be adapted to every part of Gas Apparatus where a Valve is required.

Drawings, Price Lists, and further information sent on application.

Agents for

Messrs. NEWTON, CHAMBERS, & Co.,

THORNCLIFFE IRON-WORKS, CHAPELTOWN, near SHEFFIELD,

MANUFACTURERS OF

Gas Apparatus, Gasholders, Scrubbers, Condensers, & Purifiers; Iron Main-Pipes, Valves, & Fittings for Gas and Water; Wrought-Iron Retort-Lids; Wrought & Cast Iron Girders, Bridges, Piers, &c.

FULLERTON, SON, & CO.,

GAS-METER MANUFACTURERS,

LONDON ROAD METER-WORKS, EDINBURGH,

SOLE MANUFACTURERS OF

THE PATENT IMPROVED TIN-PLATE DRY METER;

With special facilities for adjusting and repair, the principal parts of the mechanism being accessible by the removal of a single screw.

Gas-Meters on the Wet and Dry principles made in Cast-Iron and Tin-Plate Cases.

Station-Meters, Governors, Experimental & Test Meters, Gas Apparatus, &c.

LONDON AGENTS:

THORNELOE & CO., 34, London Wall, City, E.C.,

Where Meters are supplied to order from Stock.

TO GAS COMPANIES, ENGINEERS, BUILDERS, &c.

THE PATENT ANTI-GALVANIC PAINT

Is guaranteed to prevent and arrest Rust on all Ironwork, and to cover Tar most effectually. It is most valuable for protecting it from the action of salt water, rain, sulphurous and gaseous exhalations. It has been well tested at various Gas-Works, in covering Tar on Gasholders, Purifiers, &c., and has given great satisfaction.

Testimonials given if required, and sample cans for trial sent free of charge.

All communications to be addressed to

Messrs. STEVENS & CO., 156, CHEAPSIDE, LONDON.

GAS COMPANIES & LOCAL BOARDS

Requiring New Street-Lamps are recommended

KEEN'S PATENT DOUBLE-CLIP STREET-LAMP.

A great improvement on the old-fashioned 14-in. Lamps.

They have been sold to various Gas-Works throughout the country, and the highest satisfactory testimonials are given as to their superiority.

For particulars of price, &c., apply to

EDWARD JEEVES, Manufacturer, WEYBRIDGE, SURREY

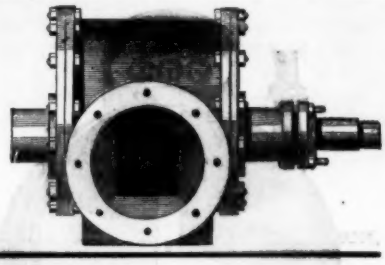
ROTATORY AND DOUBLE-ACTING GAS-EXHAUSTERS,

With many recent improvements, from 1500 to 150,000 cubic feet per Hour.

JAMES BURTON, SONS, & WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS,
Efficient and durable TAR, LIQUOR, and SYPHON PUMPS,
GAS-VALVES, with or without Wedges, worked with powerful Worm and Rack,
SELF-ACTING BY-PASS VALVES, with Lid and Relieving Lever,
ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.
SMALL-SIZE EXHAUSTERS KEPT IN STOCK.

JOHN'S PLACE, HOLLAND STREET, SOUTHWARK, LONDON, S.E.



KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.

KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

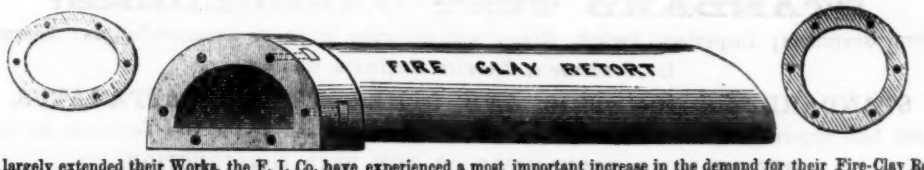
Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

Agent in Ireland—Mr. JAMES FURNESS, No. 3, FOWNES STREET, DUBLIN.

THE FARNLEY IRON COMPANY,

FARNLEY, near LEEDS.



Since they so largely extended their Works, the F. I. Co. have experienced a most important increase in the demand for their Fire-Clay Retorts, which they owe chiefly to the superior quality of their make, and to the facilities they now possess for executing orders promptly, either for *home* or for *export*.

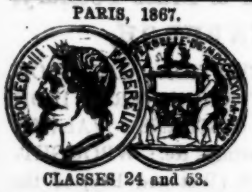
The Fire-Clay raised from the Farnley Estate (commonly called the Wortley bed) is unsurpassed by any other known in the district, and is peculiarly well adapted for Retorts, Gas-Ovens, and Fire-Bricks; and the F. I. Co. beg especially to invite those connected with Gas-Works, who have not yet used their Retorts, to be good enough to favour them with a trial.

The F. I. Co. generally hold in stock, for immediate supply, Fire-Bricks of every size and kind—Tiles, Sanitary Tubes, Ornamental Terra-Cotta Ware White Facing Bricks, the White, Buff, and other Glazed Bricks and Tiles, in various colours and shapes, &c., as well as the Brown Salt-Glazed Bricks, &c., &c.

Prices, Drawings, and all other information may be obtained by applying as above, or to

MR. SUTTON, THE HULL STORES, 46½, QUEEN STREET, HULL.

PARIS, 1867.



CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.

CLASSES 13 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS,

LAMP METERS AND BOXES.

LOWE'S JET PHOTOMETERS CAN NOW BE RATED TO 14 CANDLES.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS.

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

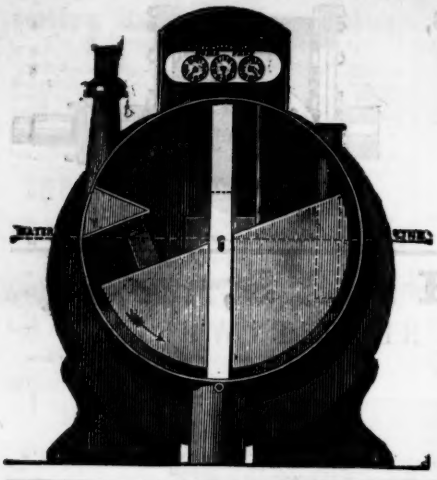
FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON AGENT:

MARCUS BOURNE NEWTON,

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.



THE

UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."

Over 60,000 in action.

MANUFACTURERS:

THE GAS-METER COMPANY,

KINGSLAND ROAD, LONDON;

WITH

Branch Manufactories at DUBLIN and OLDHAM.

ALEXANDER WRIGHT & CO.,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURERS OF

COMPENSATING & OTHER WET & IMPROVED DRY GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, AND REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

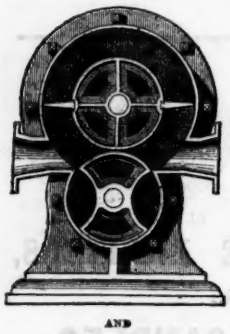
STANDARD PHOTOMETRIC AND OTHER TESTING APPARATUS,

Employed by the best experimenters in this country and on the Continent, and by the Gas Testers in the London districts.

STREET-LAMP REGULATORS OF THE BEST CONSTRUCTION,

Adjusted to any desired consumption.

LAIDLAW'S PATENT GAS EXHAUSTER



AND

ROTARY PUMP.

R. LAIDLAW & SON,

GAS ENGINEERS, CONTRACTORS, IRON & BRASS FOUNDERS,

Iron-Works and Foundries, GLASGOW,

Meter-Works & Brass Foundry, EDINBURGH,

Manufacturers of GASOMETERS & GAS APPARATUS of EVERY DESCRIPTION; CAST-IRON PIPES, all sizes, cast in DRY SAND and VERTICALLY by PATENT MACHINERY; IRON ROOFS, COLUMNS, BEAMS, & GIRDERS; BOILERS, TANKS, & CISTERNS; VALVES, Screw, Rack and Pinion, &c., for Gas and Water, with Iron or Gun-Metal Facings, &c.; WROUGHT-IRON TUBE and FITTINGS for Gas, Water, or Steam; GAS-METERS (Wet and Dry) of the most approved Construction, STATION-METERS, GOVERNORS, &c.; GASELIERS, BRACKETS, PENDANTS, PILLARS, & GAS-FITTINGS of every description; LAMP-POSTS and LANTERNS for Streets, &c.

London Address: 106, CANNON STREET, E.C.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

Invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT IRON PIPE, BLACK & GALVANIZED. COPPER, TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—65s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern-Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11 Bolt Court Fleet Street, in the City of London.—Tuesday, November 8, 1870.